MODERN PLASTICS

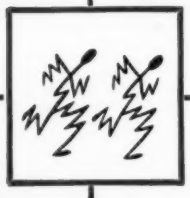
MARCH 1952

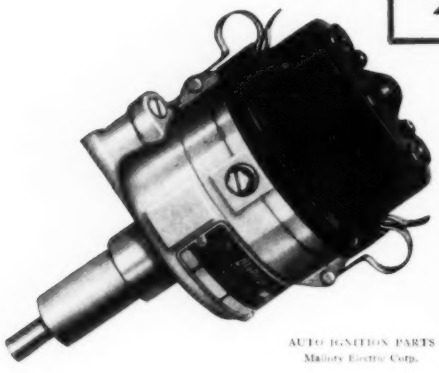
Plastics Futures

Figure on PHENOLICS to keep "juice" on the job

CABLE JACKET
Picker X-Ray Corp.

POWER TIMING LIGHT
Sun Electric Corp.





AUTO IGNITION PARTS
Mallory Electric Corp.

TRANSFORMER SWITCH FRAME
McDonald Mfg. Co.

...plan to use custom-molded DUREZ

Designing the properties you want into electrical and electronic products is in part a matter of selecting the right electrical-grade Durez plastic. Good judgment at this point can be expected to pay off automatically in cost economies, product performance, and profit.

Being phenolics, these plastics possess the toughness, dimensional stability, lustrous finish, and resistance to heat, oil, and moisture required in numerous forms of electrical service.

These phenolics are mineral-filled. They have been developed by Durez especially for these services, with specific electrical properties that will meet modern industrial requirements. Dielectric strength of these compounds is as high as 450 (V/M-ST), and power factor as low as .02 (1 kc. conditioned 48 hrs. at 50°C.)

The electrical types are among the more than 300 Durez molding compounds that offer you the right properties in the right degree for your product. Your custom molder can help you apply them. His knowledge and equipment are of value in holding down costs at numerous steps from blueprint to assembly and shipping. Technical counsel is readily available through the Durez field staff.

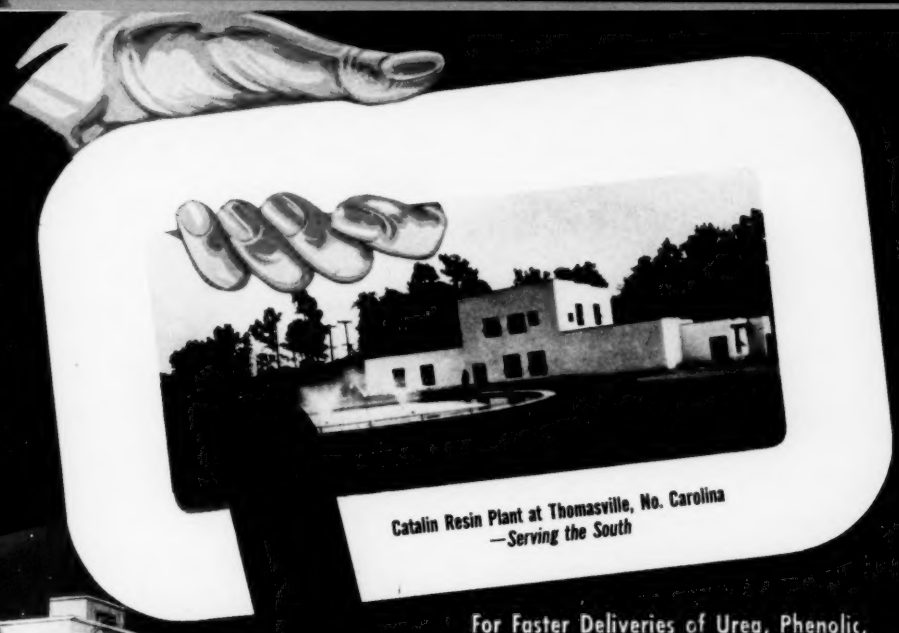
DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

Our monthly "Durez Plastics News" will keep you informed on industry's uses of Durez. Ask us to send a copy regularly. Durez Plastics & Chemicals, Inc., 1203 Walck Road, North Tonawanda, N. Y.

PHENOLIC PLASTICS THAT FIT THE JOB



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In the South and Mid-west CATALIN has, within the past two years, erected and fully equipped two full-scale resin manufacturing plants!

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For laminating, bonding, glueing, impregnating or fabric finishing, CATALIN welcomes an opportunity to discuss its uniformly produced, quality controlled resins with interested manufacturers.

Visit the CATALIN exhibit of Resins and Styrene Molding Compounds at

5th NATIONAL PLASTICS EXPOSITION
PHILADELPHIA
MARCH 11-14
BOOTH 345

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE • NEW YORK 16, N. Y.

MODERN PLASTICS*

VOLUME 29 MARCH 1952 NUMBER 7

CONTENTS

MODERN PLASTICS BULLETIN

A Special News Service ..... **Facing p. 88**

GENERAL SECTION

Futures and the Plastics Exposition (Editorial) .. 5

New Heights Ahead for Plastics 93
Introducing the theme of the "Plastics Futures" feature articles in this issue

Designed For Plastics

The Cross-Country Commuter 94
by Raymond F. Loewy

Multiple Uses—Wider Markets 96
by Gerald C. Johnson

Schoolroom of the Future 98
by Jean O. Reinecke

Packaged Bathrooms 100
by Michael Saphier

All-Weather Stadium 102
by Alexander Knowlton

Changing the Kitchen Scene 104
by Belle Kogan

Ceramic Tile + Plastics 106
by J. Gordon Lippincott

Projects for Cellulosics 108
by Carl W. Sundberg

Furniture That Grows 110
by Gerald Stahl

Reinforced Plastics Concepts 112
by J. McLeod Little

There's a Science to Seating 114
by Robert L. Gruen

Disposable Rainwear 116
by Egmont Arens

End Users Look Ahead 118
Representative major end users of plastics talk about the future

Materials Men Predict 128
A broad picture of Plastics Futures, sketched with the background of materials makers

Plastical Archeology 132
by Dr. Johan Bjorksten
Plastics progress in the 20th Century, as viewed by an archeologist in the year 6943

PLASTICS ENGINEERING

What the Engineers Want 137
Molders, extruders, and fabricators offer suggestions for improvements in machinery and equipment

Tomorrow's Compression Plant? 147
A laboratory setup of today forms a pattern for the production plant of tomorrow

TECHNICAL SECTION

Tomorrow's Plastics Technology 149
by Dr. Howard E. Fritz
Where are tomorrow's plastics coming from, and what are we going to do with them?

Resins as Finishing Agents 151
by D. G. Patterson, E. B. Detwiler, and T. J. Suen
Use of urea- and melamine-formaldehyde resins in improving the quality or properties of paper, textiles, and leather

DEPARTMENTS

Plastics Digest 168

U. S. Plastics Patents 176

New Machinery and Equipment 180

Books and Booklets 184

Production of Plastics Materials 192

THE PLASTISCOPE 278
News of the Industry; Predictions and Interpretations; Company News; Personal; Meetings

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*Reg. U.S. Pat. Office

News about

B. F. Goodrich Chemical Company *raw materials*

LOOK!

vinyl plastics of tomorrow here today!

Geon Resin 404 excels in rigid applications with a wide range of uses

YOU wouldn't have guessed a few years ago that there would be a *high molecular weight* vinyl chloride resin that could be processed without plasticizer on standard equipment—mills, extruders, calenders. It's here today—Geon 404, especially designed for rigid applications.

Pictured here is corrugated translucent paneling material, made by laminating and molding sheets calendered from Geon 404. The panel is decorative, light, yet strong and durable. Color possibilities are unlimited. It can be wiped clean with a cloth and, of course, it's *fire resistant.*

Sheets, rods and tubes made from Geon 404 can be sawed, drilled and machined on ordinary wood and steel working machines. They can be readily welded in fabricating finished products.

Geon 404 has many uses. Processed without plasticizer, it has better chemical resistance than plasticized vinyls. It is finding many uses in industries where resistance to chemicals and corrosion is necessary, such as chemical processing, rayon, beverages, plating and foods. Its electrical properties are superior to those of standard plasticized vinyl compounds.

Geon 404 is a promise of an even greater future for the vinyl plastic family in variety of materials and expanded uses! For complete information on Geon 404, please write Dept. GA-3, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

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GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

CHICAGO MOLDED Plastics made these products better

Perhaps your product belongs in this picture

Here is a group of molded plastic parts used in important machines and equipment. For some, no other material could possibly do the job so well as molded plastics. Others were first molded of plastics because of wartime shortages of strategic materials . . . but the *replacement* was found to be *better than the original material.*

There are many advantages offered by modern plastics molding materials such as high strength-to-weight ratio; resistance to oils, chemicals and water; heat and electrical insulation; built-in-color; economical production of complex shapes. You may find, like hundreds of others, that your product or part can be made better, or at lower cost, or *both*, by this modern method.

Choose your molder wisely In order to realize to the fullest the potential values offered by plastics, an experienced molder is essential. That's why we urge you to select someone like Chicago Molded. Here you will find an organization with over 32 years experience in plastics . . . a combination of know-how and facilities hard to equal anywhere. It's a combination that insures successful results right from the start. Perhaps that's why 60% of our business comes from firms we have served 15 years or more.

It costs you nothing to talk things over with a Chicago Molded engineer and you'll most likely find it time well spent. Just write or phone us. There's no obligation.

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CUSTOM MOLDERS OF ALL *Plastics*

1046 NORTH KOLMAR AVENUE • CHICAGO 51, ILLINOIS

EDITORIAL

Futures and the Plastics Exposition

No matter how they collect and organize their statistics and projections, all leading economists predict for this nation more than adequate production of all materials by the end of this year. There will be ample to make the arms we need, to maintain the military machine we have established, and to satisfy civilian requirements. And conservative prophets predict a 347 billion dollar minimum gross national product this year.

In plastics, the supply picture is even more inspiring. Synthetic resin production this year will be 2,600,000,000 lb. or more than double that of 1947, and more than six times that of 1942. Indeed, the *increase* in plastics production in 1952 over 1951 will almost equal the *total* production of plastics in 1940.

Exhibitors at the Fifth National Plastics Exposition will tell by display and brochure the story of their individual contributions to this, the most fabulous expansion ever experienced by any industry. They will show how plastics have superseded other materials to do a better job in thousands upon thousands of applications. They will show what further steps they are taking to worthily increase plastics applications currently or in the near future.

Because their purpose is to promote immediate sales of their materials, products, machines, equipment, and services, these exhibitors will be in the main most conservative and pragmatic. So a word to those who will attend the exposition:

Availability of most plastics is assured for 1952 and for the future. The amount that will go into defense production will be much more than replaced by increased materials facilities. At molder and processor level, the equipment position of the industry is excellent. Our engineering services are at least as good as those of any other industry—and are not inhibited by tradition.

So we will have enough plastics; we will have the equipment with which to convert them to products and components; we will have the brain power to plan and direct that conversion. Some other materials will not be in such ample supply. And still others will suffer by economic comparison.

This Fifth National Plastics Exposition will be a good time for this industry, its end users, customers, and its prospective customers, to study plastics futures and the possibilities of new and broader applications. This issue of MODERN PLASTICS is dedicated to that proposition. You'll find little herein about past accomplishments of the industry, little about long-proved applications of plastics. But you'll find the basis for thousands of ideas for new uses of plastics, some immediately practicable and some for future consideration. You'll find many of these ideas carefully explained, generally illustrated, and, where possible, documented.

Individual contributions to the issue from designers, chemists, engineers, sales executives, and development men numbered over 120. MODERN PLASTICS editors held over 300 interviews in the course of obtaining material for this issue. Editorial correspondence was easily three times that of a normal issue.

Every care was taken to secure the opinions of respected authorities in each field covered. Every idea presented was cross-checked with its originator.

We sincerely believe that any man who will visit and study the National Plastics Exposition with a view to Plastics Futures will find his own and his company's future vastly enhanced thereby.

We hope with this issue to contribute something in the way of inspiration to that end.

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Thickness Tested	1/16"
Moisture Absorption (24 hours)	0.42%
Expansion after 24-hr Immersion in Water at 77°F	
Center	0.0002"
Edge	0.0003"
Tensile Strength	
Main Direction	18,000 psi
Cross Direction	14,000 psi
Flexural Strength	
Main Direction	21,000 psi
Cross Direction	17,000 psi
Dielectric Strength (perpendicular to laminations)	
Short Time	700 v.p.m.
Step by Step	600 v.p.m.

	Tests at Room Conditions	After 96 hr at 90% Rel. Hum. at 104°F
Power Factor at 1 megacycle	0.030	0.031
Dielectric Constant at 1 megacycle	4.5	4.7
Loss Factor at 1 megacycle	0.134	0.146
Insulation Resistance, megohms		121,000

Mallory engineers ran repeated tests on INSUROK T-725, and found that it has not only high insulation resistance, but excellent *resiliency*, which permits rapid staking of terminals under pressure without cracks in the immediate staking area. This quality, according to Mallory, "... prevents electrical losses due to surface collection of moisture in cracks. Mallory RL Switches thus have longer service life."

T-725 is practically unaffected by sanding, and meets the property requirements of MIL-P-3115 and other rigid government specifications. These parts are being fabricated by Richardson—in large volume—and with critical dimensions held to ± .002" or less. Investigate INSUROK laminated and molded plastics for *your* product.

Write for Data Sheet on T-725 and illustrated booklet—"Laminated INSUROK."

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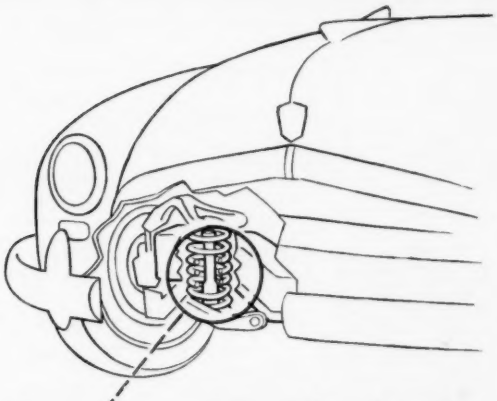
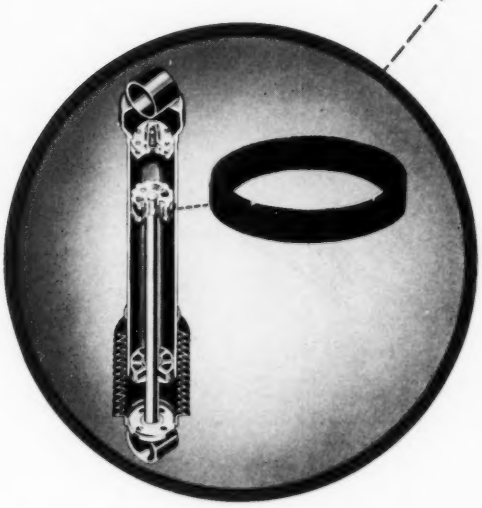


Du Pont nylon part functions as automatic thermostat



Columbia shock-absorber piston ring molded for Heckethorn Manufacturing and Supply Company, Littleton, Colorado, by Formold Plastics, Inc., Chicago.

Nylon piston ring controls flow of fluid in new hydraulic shock absorber

When engineers set out to design this shock absorber, they were faced with the problem of regulating the proper flow of hydraulic fluid under all temperature changes. The problem was solved by installing a piston ring molded of Du Pont nylon. Called a "thermo ring," this key part actually functions as a thermostat, automatically controlling the flow of fluid at any temperature.

The nylon "thermo ring" is fitted to the assembly, which includes rebound and compression valves. These valves control flow of fluid through the piston. The "thermo ring" not only permits oil to flow both around and through the hydraulic piston—thereby providing the necessary damping action—but it also regulates this oil flow during extreme changes in temperature.

Du Pont nylon is unaffected by abrasion and organic solvents . . . as well as by the 205°F. maximum operating temperature of the shock absorber. It has the toughness to withstand the 200-lb. maximum pressure build-up of the shock. Exhaustive tests were made prior to the specification of nylon for the "thermo ring." It was found that no other material investigated had the combination of properties necessary to achieve the results obtained with molded Du Pont nylon.

Perhaps nylon's strength, resiliency and other valuable properties can help improve or develop a product for you. For further information on nylon and other Du Pont plastics, write;

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept., District Offices:
350 Fifth Avenue, New York 1, New York
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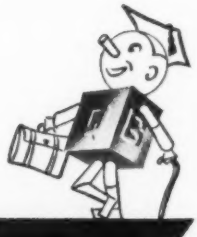
The next time you are faced with a problem involving plastics, call "Cubee". Here at Quinn-Berry we have all of the facilities necessary to the meeting of your requirements. Every step, from original design to the finished plastic part, is right here under one roof—one responsibility.

We have produced both simple and intricate parts for nearly every industry. Take advantage of our experience. There's no gamble when you call "Cubee".



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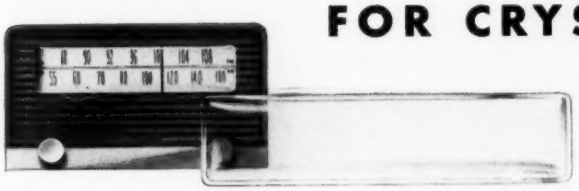

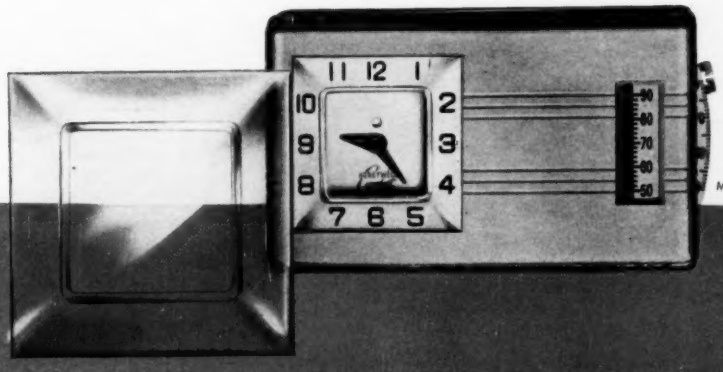

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Celanese *acetate* sheeting is widely used for crystals of all types: instrument windows, appliances, radios and meters . . .

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Celanese *acetate* sheeting is available in cut-to-size sheets, cut lengths and rolls—in a range of widths and thicknesses. The new Sheeting Booklet is now on the presses. Write for your copy.

Celanese Corporation of America, Plastics Division, Dept. 101-C, 180 Madison Avenue, New York 16, N. Y. In Canada, Canadian Cellulose Products Ltd., Montreal and Toronto.

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Celanese* Acetate PLASTICS

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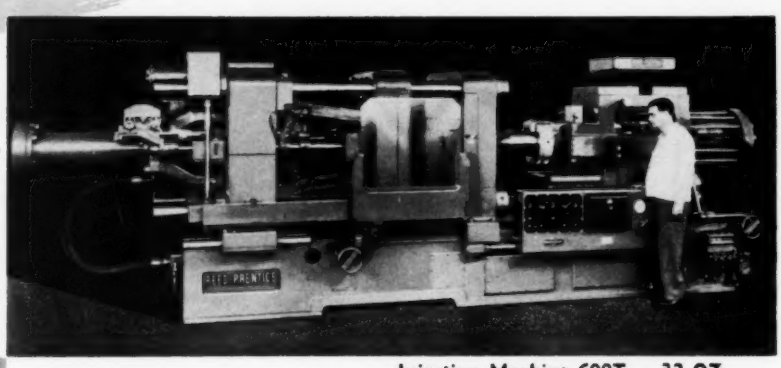
Injection Molding Machines

SPECIFICATIONS:	32 oz.
Die locking pressure, tons	600
Rated Casting area, sq. in.	300
Mold opens	24"
Max. die space	28"
Size of die plates	45x54"
Weight, lbs.	46,100



Injection Machine 600T — 32 OZ.

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These molders know they can minimize rejects and emphasize production with "REEDS" like the new 32 oz. model that develops 600 tons clamping pressure, provides large 45 x 54" die platens and affords greater plasticizing capacity.

Plan for more profits in plastics by visiting our Booth No. 200 at the National Plastics Exposition.

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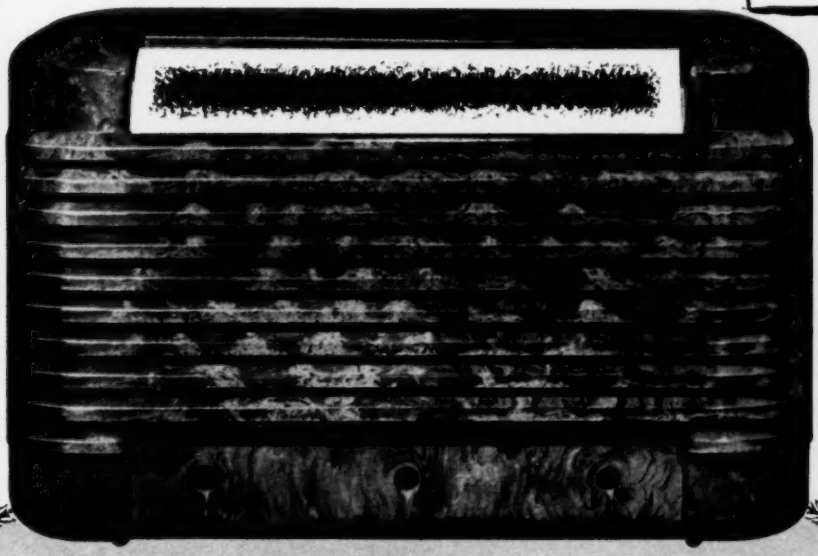
a "different" finish by LOVEN



blonde mottled phenolic cabinet
for **PACKARD-BELL** *radio*

Molded by Peerless Plastics of Culver City, California, this smart new finish, adding to the salability of the set it encloses, shows one example of the versatility of LOVEN Phenolics.

If you are looking for unusual finishes, get in touch with the LOVEN office nearest to you. Our research laboratories are at your service to cooperate in developing the "*something different*" in molding that spells "more sales" in unmistakable terms.

CHICAGO OFFICE: *C. R. Olson—102 Keeney Street, Evanston, Illinois*
WASHINGTON OFFICE: *Theodore T. Hayes—414 Ring Bldg., Washington, D. C.*

LOVEN CHEMICAL *of California*
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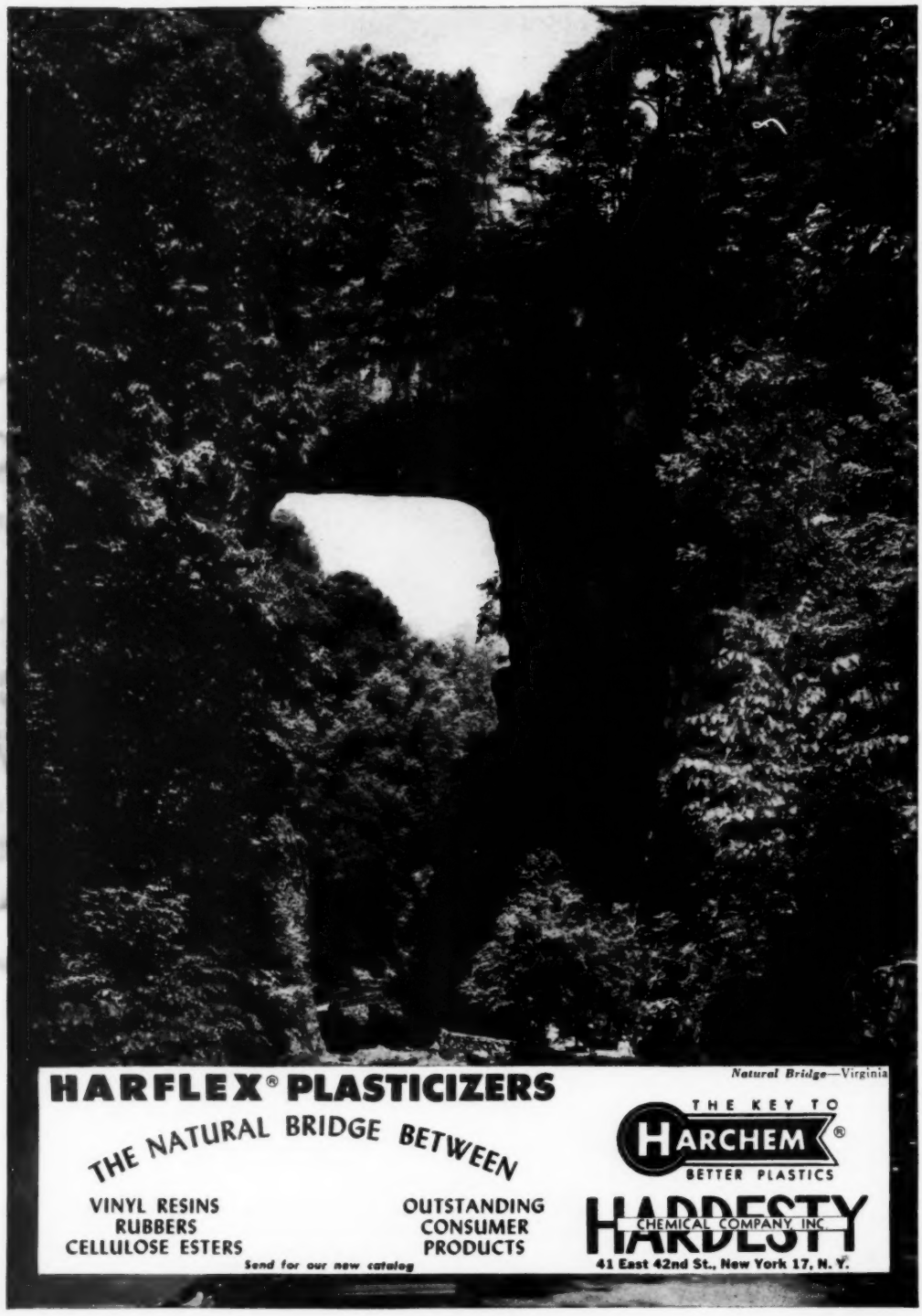
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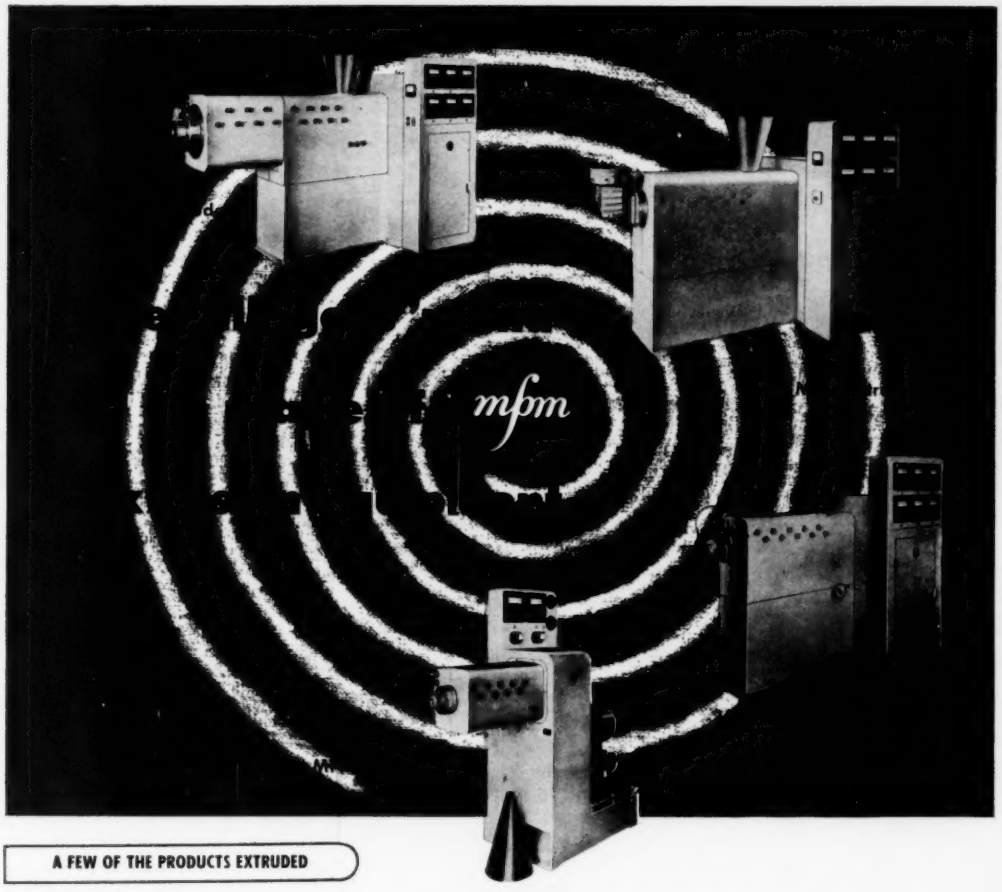


A FEW OF THE PRODUCTS EXTRUDED

insulated wire
rods and tubes for jewelry beads
wide polyethylene sheet
heavy rods for screw driver handles
insulated cable up to 2" diameter
monofilaments for weaving fabric
uniformly colored and compounded pellets for extrusion or molding
paper coated with polyethylene
welting for upholstery
profiiles and shapes

SOME OF THE MATERIALS EXTRUDED

polyvinyl chloride
nylon
Kel-F
polystyrene
cellulose acetate
polyethylene
cellulose acetate butyrate
ethyl cellulose
methyl methacrylate
polyvinyl alcohol
casein
Formvar

Not only at the Plastics Show, but wherever plastics technicians gather, you'll find them discussing the outstanding qualities of MPM extruders and auxiliary equipment.

There's no question about it — MPM's combination of better heat control, complete internal corrosion resistance, extreme production flexibility and overall design superiority make these extruders the favorites of leading manufacturers all over the world.

To see what we mean, be sure to visit the MPM exhibit, **Booth 250,** at the Plastics Show. Or, if you can't make the Show, write for descriptive literature.

15 Union St., Lodi, N. J., U. S. A.
Cable Address: MODPLASEX

WATSON-STILLMAN HAS BEEN...

CALLING TH

Over HALF A CENTURY

for AMERICA'S LEADING MOLDERS

Growth and development of plastics molding as an *industry* has so impressively accelerated during the past few years that we are inclined to regard it as a youngster in *technique*. Actually, most current "innovations" in plastics equipment are rooted in experimental work going back more than 50 years to the days of celluloid collars and the first plastic billiard balls . . . to the pioneering days of Watson-Stillman research in what then gave slight promise of becoming the modern giant plastics industry of today.

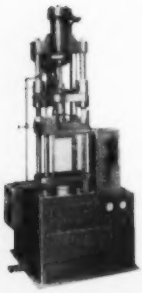
Throughout its 50 years of leadership in molding equipment manufacture, Waston-Stillman engineering has continued to "call the shots" on new materials, mold design, improved controls and, above all, on larger machine CAPACITY.

For instance, the presently popular "new" trend toward increasing capacity by means of *preplasticing* units was introduced by Watson-Stillman years ago . . . tested, improved, perfected through original research in shop and field by Watson-Stillman engineers . . . and has been successfully employed on Watson-Stillman units from 12 to 300 ounces capacity for years.

Each and every Watson-Stillman Machine is rated for its minimum capacity. This assures a margin of safety in Production . . . W-S Machines *deliver the goods.*

Today, as for more than fifty years past, it will pay you to consult Watson-Stillman *first* when you are molding by compression, transfer and injection techniques or when planning expansion or a new plant.

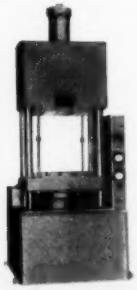
SEE US AT THE PHILADELPHIA PLASTICS SHOW, BOOTHS 208 and 212



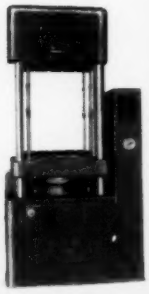
2 Ounce Semi-Automatic Injection Molding Machines

Vertical Injection Molding Machines—1, 2, and 6 ounces.

Preform Tableting Machines —10 and 100 Tons

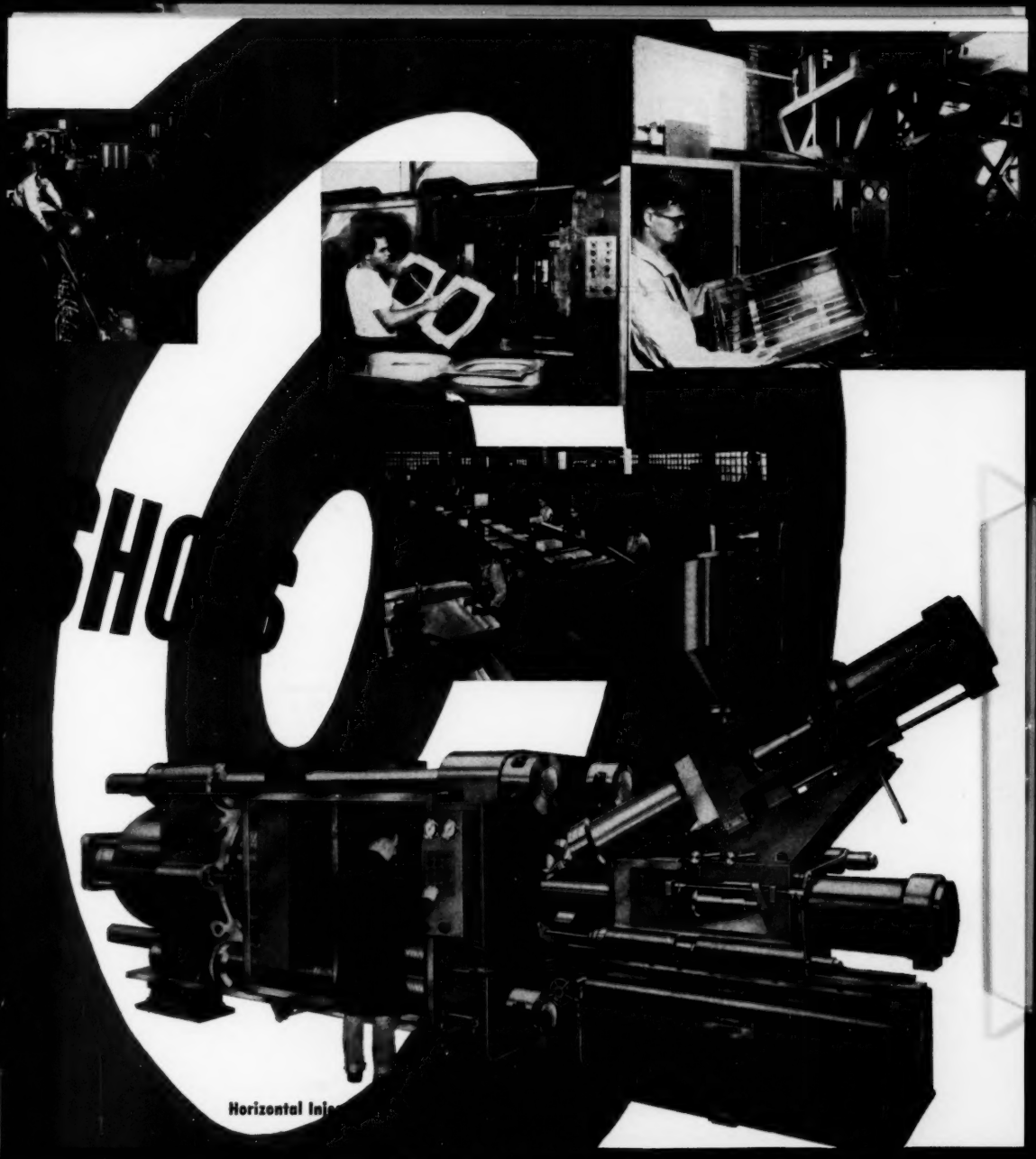


Transfer Molding Machines —30 to 1200 Tons



Compression Molding Presses —50 to 1200 Tons

W-S "COMPLETELINE"—SHORTEST DISTANCE FROM PRODUCTION TO PROFIT



HYDRAULIC MACHINERY DIVISION

WATSON-STILLMAN

W-S HYDRAULIC

ESTABLISHED 1848

Factory and Main Office: 150 Aldene Rd., Roselle, New Jersey

Branch Office: 228 N. LaSalle, Chicago, Ill. • Manufactured in Canada by—Canadian-Vickers, Ltd., Montreal

REPRESENTATIVES

Akron, Ohio	Watson-Stillman Co.	Denver 2, Colo.	Overgard Machine Tool Co.	San Francisco, Cal.	Shellenbach Mach. Tool Co.
Birmingham 3, Ala.	George M. Meriwether	Indianapolis, Ind.	W. K. Millholland Mach. Co.	St. Paul 4, Minn.	Anderson Machine Tool Co.
Buffalo, N. Y.	Don. W. Patterson Co.	Los Angeles 58, Cal.	H. M. Royal, Inc.	Seattle, Wash.	Machinery & Tool Supply Co.
Dallas, Texas	M & R Sales Company	Pittsburgh 19, Pa.	Stanley Berg & Co.	Spokane 8, Wash.	Machinery & Tool Supply Co.
		Portland, Ore.	Machinery & Tool Supply Co.		

Foreign Sales Representatives: OMNI PRODUCTS CORP., 460 Fourth Ave., New York 16, N. Y.
Correspondents Throughout the World

PRODUCTION & QUALITY UP, REJECTS DOWN WITH

STERLING SPEED-TROL!

Mr. W. J. Johnson, President of Modern Plastic Machinery Corp., leading manufacturer of plastic processing equipment, states that highly versatile, dependable Speed-Trols increased production due to wide speed range, less maintenance and down-time; reduced rejects and improved quality because of accurate, positive speed regulation; saved 20% floor space because of compactness.

STERLING SPEED-TROL GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

EQUIPMENT ADAPTATION TO: Sequence synchronization—operators' abilities—load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality and profit

OTHER STERLING ELECTRIC POWER DRIVES:

- **STERLING SLO-SPEED (GEARED) MOTORS**
- **STERLING KLOSD AND KLOSD-TITE (NORMAL SPEED) MOTORS**

DRIP-PROOF • SPLASH-PROOF • TOTALLY ENCLOSED

70 ILLUSTRATIONS showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. **A 114**

STERLING ELECTRIC MOTORS

Plants: New York City 51; Van Wert, Ohio; Los Angeles 22; Hamilton, Canada; Santiago, Chile.
Offices and distributors in all principal cities.

Want the right answer to your plastics problem?

You're on the right track to the right answer when you call in Kurz-Kasch first—one of the largest and most experienced moulders of thermosetting plastics in the country. All we need to help you is your inquiry on the plastic moulded part *you* need. And if you'll use this check list to prepare that inquiry, you'll be helping us to help you more quickly. Here it is:

- ☐ If you're in a hurry for a price, will an *approximate* price do? If so, please state. Most moulders are pretty fair at guessing, but hate to hang their hats on such guesswork.
- ☐ If it's a *firm* price you want we'll need a little more time. Average estimates cost us about $35.00 and there will probably be many requests ahead of yours. But your estimate will reach you sooner, and your prices will be more attractive, if you are *specific* and follow these rules:
- ☐ Be sure blueprints are legible.
- ☐ Relax tolerances wherever possible. (Circle those dimensions which *must* be held.)
- ☐ Advise how the part will be used and show its next assembly, if possible.
- ☐ State the material required if you know it. If not, give information on heat requirements, color, moisture and chemical resistance, impact, electrical or tensile requirements.
- ☐ How large a mould is required? What will be your ordering requirements? How many parts will you use per year? How many years do you estimate the item will be active?
- ☐ How much finishing is actually required on the part?

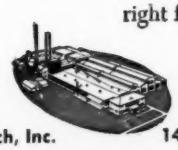
  Must the gate be ground flush?

  Will a tumble finish suffice for flash removal?

  Will the ultimate consumer actually see the part or any particular portion of the part?

  What finishing on this part will be done in your plant?
- ☐ If inserts are required, who is to furnish them? Send blueprints of inserts. Advise if plastic flash must be removed from inserts.
- ☐ Is a model or sample part available? Can we see it?
- ☐ Are suggestions for minor changes in design acceptable?

You'll get the right price for the plastic part that's right for the job in every way if you'll follow this check list. And if the part you need calls for thermosetting materials that can be compression, transfer or plunger moulded, you'll get the right supplier with the right facilities if you pick Kurz-Kasch. We're ready when you are.



Kurz-Kasch, Inc. **1415 South Broadway • Dayton 1, Ohio**

Branch Sales Offices: New York, *Lexington 2-6677* • Rochester, *Hillside 2415M* Chicago, *Harrison 7-5473* • Detroit, *Trinity 3-7050* • Philadelphia, *Granite 2-7484* Dallas, *Logan 1970* • Los Angeles, *Richmond 7-5384* • St. Louis, *Delmar 9577* • Toronto, *Riverdale 3511* • ***Export Office:*** 89 Broad Street, New York City, *Bowling Green 9-7751.*

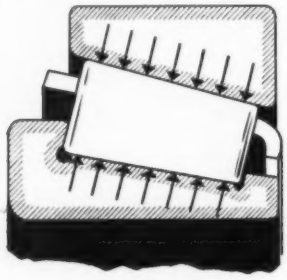
Kurz-Kasch

FOR OVER 36 YEARS PLANNERS AND MOULDERS IN PLASTICS

6 problems you can solve with TIMKEN® bearings

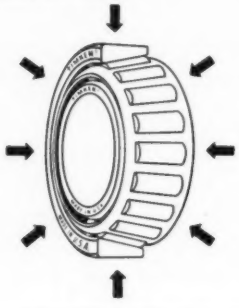
HEAVY LOADS

Loads carried on the rollers and races of Timken® bearings are spread evenly over a line of contact. The greater load area assures extra load-carrying capacity.



COMBINATION LOADS

Due to their tapered design, Timken bearings carry radial and thrust loads in any combination. No auxiliary thrust bearings or plates are needed.

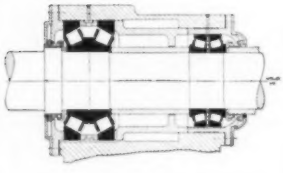


PRECISION

Timken bearings hold shafts in positive alignment, prevent end-movement, minimize deflection. Gears mesh precisely, assuring a smooth flow of power.

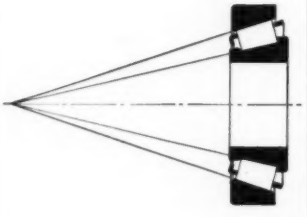
MAINTENANCE

Closures are more effective because Timken bearings keep housing and shaft concentric. Dirt and grit are kept out. Lubricants are kept in.



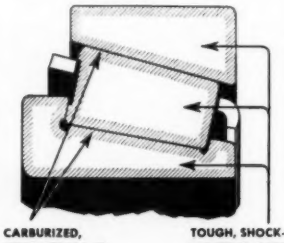
FRICTION

Timken bearings roll freely due to true rolling motion. Lines coincident with tapered surfaces of rollers and races meet at a common point on the bearing's axis.



WEAR

Rollers and races of Timken bearings are made of Timken fine alloy steel—case hardened for a hard, wear-resistant surface and tough, shock-resisting core.



Be sure to specify Timken roller bearings for the machines you buy or build. Look for the trade-mark "TIMKEN" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TAPERED ROLLER BEARINGS

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳

UNDERWOOD TYPEWRITER, *with front cover removed to show type bar cushion supporting type bars. PLIOBOND used is resistant to oils and type cleaners—gives lasting bond between metal and neoprene.*

Another Adhesive Problem SOLVED with *Pliobond*

USE PROVED *Products*

"...only satisfactory adhesive to do the job," says user

AFTER trying all known adhesives, Underwood Corporation found that ONLY PLIOBOND would give consistently perfect bonds between metal and neoprene in assembling type bar cushions.

Parts are given a uniform coating of PLIOBOND, then oven-dried at 200° F. and assembled under heat and pressure. Bond formed in this way meets all engineering specifications of the user, resists oil and cleaning fluids.

PLIOBOND "bonds anything to anything"—may be applied by brushing, spraying, roller coating, knife application or dipping. Surface preparation and bonding method varies with materials being bonded, so ask your Chemical Division representative for details, or write:

Goodyear, Chemical Division, Akron 16, Ohio

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Pliobond—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

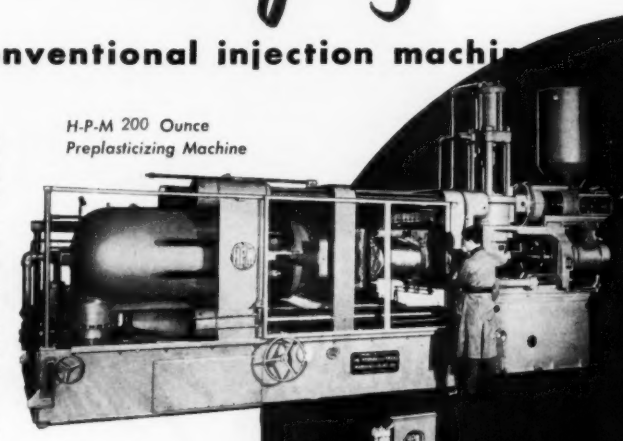
H-P-M *FIRST* with a complete

"Pre-Plasticizing"

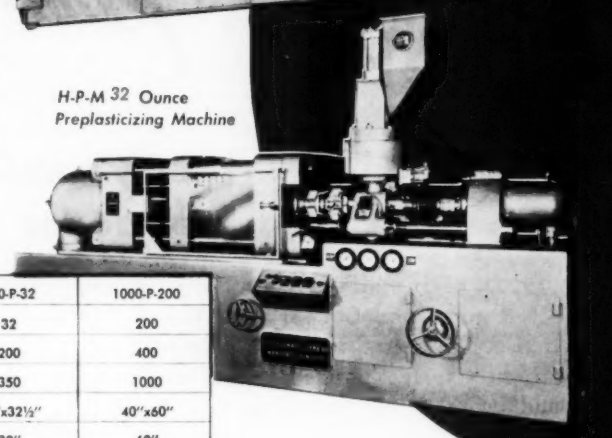
doubles capacity of conventional injection machi

● H-P-M is first to offer injection molders the many advantages of preplasticizing on a complete line of machines, both large and small. Here's what H-P-M preplasticizing means to you: (1) Shot capacity of conventional machines has been tripled, thus increasing the versatility of machines for both large and small parts; (2) Faster plasticizing rates (more than twice that of conventional machines) means more parts per hour; (3) Lower injection pressures permit lighter weight parts, fewer strains, easier part removal from mold; (4) Lower molding temperatures (below burning point) reduce possibility of discoloration or scrap.

Yes, all these advantages which the injection molder has long wished for can now go to work for you with H-P-M's new line of "Pre-plasticizing" molding machines (See chart below). For H-P-M 9 and 16 oz. machines already installed in the field, a "packaged" pre-plasticizing conversion unit is available. And, for molders desiring conventional injection machines, H-P-M's stock line shown below, is tops! Write for complete specifications.



H-P-M 200 Ounce Preplasticizing Machine



H-P-M 32 Ounce Preplasticizing Machine

H-P-M PRE-PLASTICIZING MACHINES

Model No.	250-P-20	350-P-32	1000-P-200
* Inj. Capacity (ozs.)	20	32	200
* Plasticizing (lbs./hr.)	200	200	400
Clamp (tons)	250	350	1000
Mold Space	17½"x26"	20"x32½"	40"x60"
Daylight	27"	32"	60"
Clamp Travel	18"	20"	36"

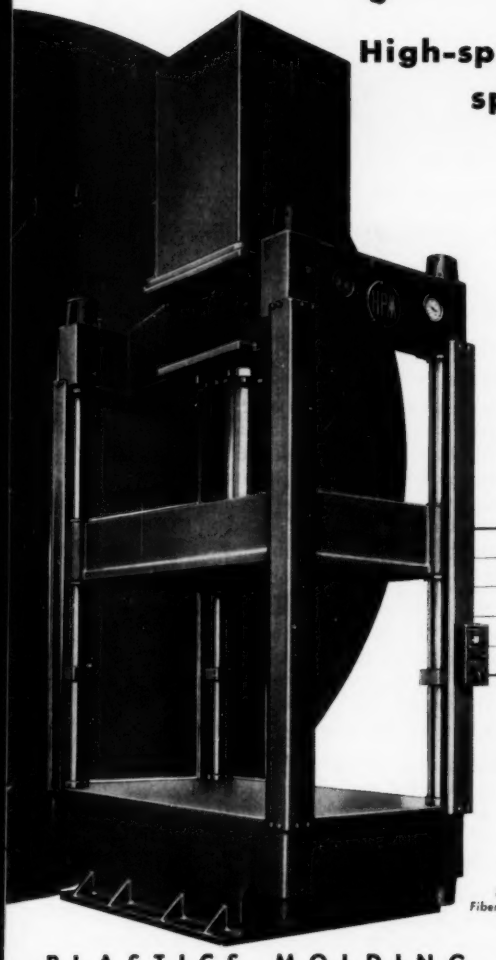
* Polystyrene (Plasticizing rate based upon continuous "stuffing" of feed plunger)

HPM . . . . THE COMPLETE LINE FOR EVERY

line of stock machines for . . .

Reinforced Plastics

High-speed, precision presses designed specifically for Fiberglas molding



H-P-M's 200-Ton Fiberglas Molding Press

● You can take full advantage of the new business markets springing up from "Fiberglas" molding with H-P-M's complete line of stock presses. Developed as the result of close cooperation with Owens-Corning, (the company that fathered Fiberglas molding) these H-P-M presses meet the rigid requirements of this new molding process. Each press is self-contained with complete H-P-M hydraulic power system and electric motor drive. Semi-automatic control—fast closing—automatic slow-downs and accurate control of pressure are but a few features in these H-P-M presses. Check the chart below for models that can be ordered to fit your production requirements. Write for copy of Bulletin 5107.

H-P-M REINFORCED PLASTICS PRESSES

Tonnage	100	150	200
Mold Size (max.)	48"x36"	60"x48"	84"x60"
Daylight	84"	84"	84"
Stroke	48"	48"	48"
Motor HP	10	10	30

HPM

VISIT H-P-M—BOOTH 414

5th National Plastics Exposition

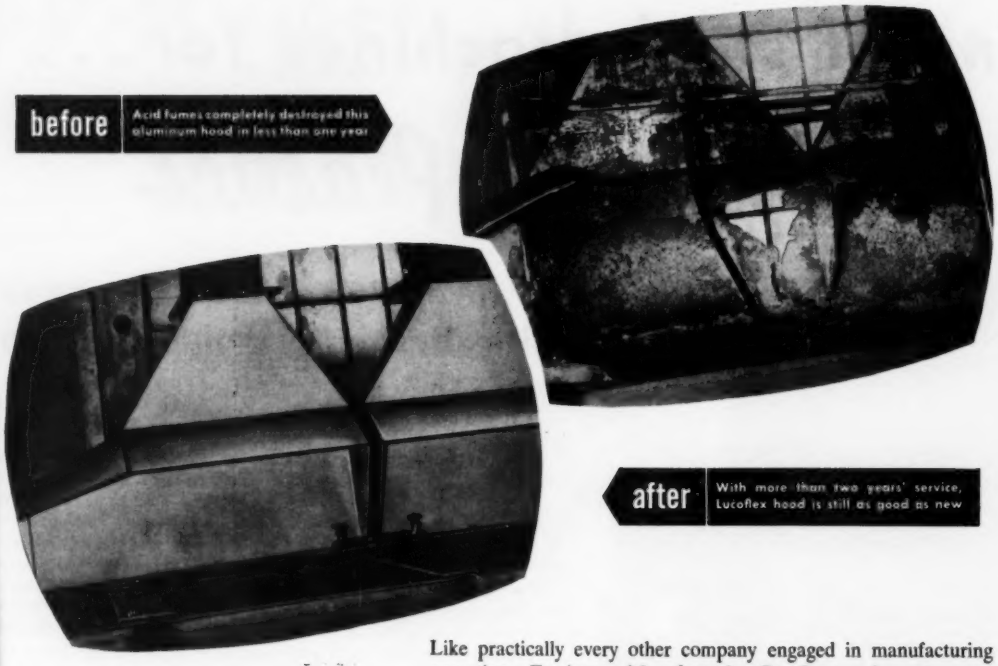
PHILADELPHIA • MARCH 11-14, 1952

THE HYDRAULIC PRESS MFG. CO.

1018 MARION ROAD - MT. GILEAD, OHIO, U. S. A.

PLASTICS MOLDING JOB . . . .

before Acid fumes completely destroyed this aluminum hood in less than one year



after With more than two years' service, Lucoflex hood is still as good as new

CORROSION RESISTANT CONSTRUCTION WITHOUT AN "ESCAPE CLAUSE"

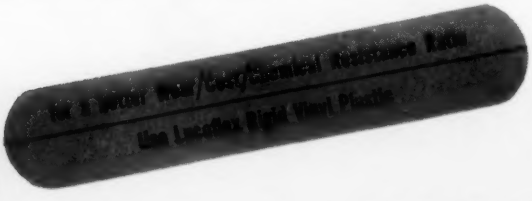
Like practically every other company engaged in manufacturing operations, Farrington Manufacturing Co., Boston, has some particularly difficult problems connected with the use of corrosive chemicals. As the unretouched "before" photo shows, nitric and sulphuric acid fumes ate big holes in metal ducts and vent hoods installed over painting tanks in Farrington's Plant # 1. The photo does not show the production slow-downs and general inconvenience caused by the escape of these noxious, dangerous fumes.

Then Farrington Manufacturing Co. replaced the unsatisfactory aluminum ducts with a new system fabricated of Lucoflex rigid vinyl plastic. Farrington reports that *after two years of continuous use the Lucoflex hoods and ducts show absolutely no signs of wear or deterioration!* Their purchasing department classifies the new installation as being of "unlimited life" construction.

Since Lucoflex comes in the form of sheets, rods, tubes and molding compounds, and can be calendered, extruded, transfer molded and fabricated—the range of applications is almost without limit. Its high melting point (170°F.) adds further to Lucoflex's versatility.

Lucoflex is highly resistant to a long list of hard-to-manage acids, bases and salts. Quite possibly, its use may eradicate a costly corrosion problem for you. For further information, write to American Lucoflex, Inc., 1 East 57th Street, New York 22, N. Y.

Lucoflex



Manufacturers of phenolic thermosetting molding compounds and phenolic synthetic resins for the electrical, transportation, home appliance, paper and pulp, protective coating and foundry industries.

Dry granular phenolic thermosetting molding compounds are produced in blacks, browns, mottles and colors in general purpose, heat-resisting and medium impact grades. Special purpose molding compounds are produced to fulfill special molding requirements.

Synthetic resins are produced in dry, lump and finely ground particle size or in solution adaptable to customer's requirements. Technical service is extended and inquiries are invited.

PLASTICS ENGINEERING COMPANY

Sheboygan, Wisconsin

WHY MAKE TEN CALLS?

WITH ONE CALL TO D-M-E YOU CAN

SAVE TIME AND EXPENSE

BY GETTING *"All Your Needs from a Single Source"*

DME *"has what it takes"*

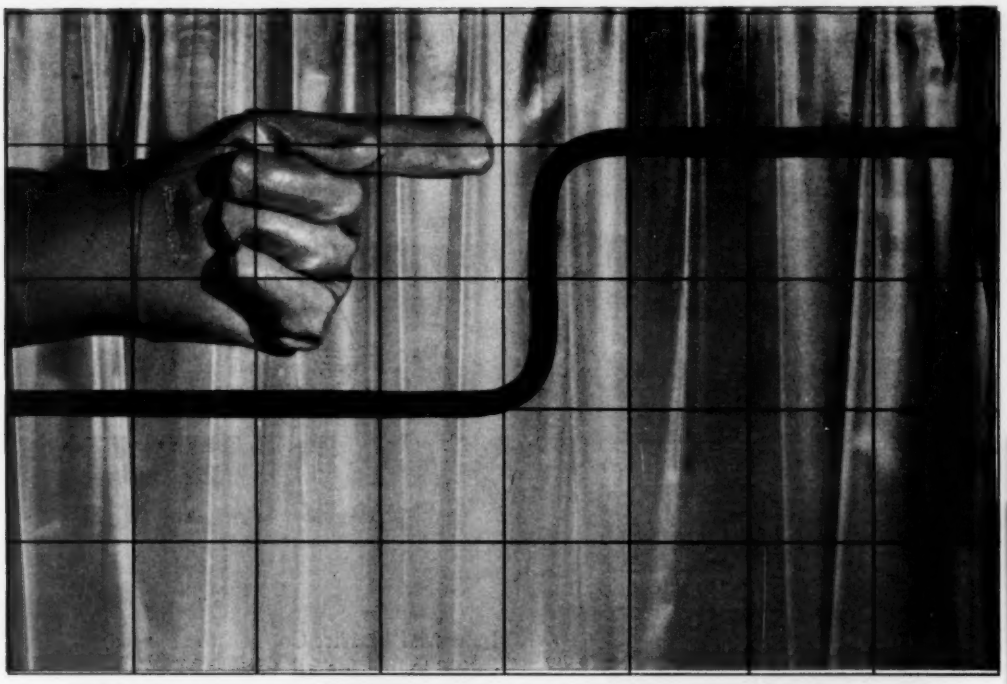
. . . TO FINISH CAVITIES . . . AND FILL ALL YOUR MOLDMAKING NEEDS

The Originators of Standard Mold Bases and Moldmakers' Supplies

DETROIT MOLD ENGINEERING CO.

CONTACT YOUR NEAREST BRANCH FOR FASTER DELIVERIES

6686 E. McNICHOLS ROAD	1217 CENTRAL AVENUE	5315 W. LAKE STREET	D-M-E CORP. — 5473 LAKE CT.	3700 SOUTH MAIN STREET
DETROIT 12, MICH.	**HILLSIDE, N. J.**	**CHICAGO 44, ILL.**	**CLEVELAND 14, OHIO**	**LOS ANGELES, CAL.**
PHONE TWinbrook 1-1300	PHONE ELizabeth 3-5840	PHONE COlumbus 1-7855	PHONE ENdicott 1-0907	PHONE ADams 3-8214
TELETYPE NO. DE 397	TELETYPE NO. ELIZ NJ 447	TELETYPE NO. CG 1840	TELETYPE NO. CV 646	



HOW TO GET 33% TO 100% MORE VINYL PRODUCTION FROM YOUR EQUIPMENT

You can increase your output of extruded and calendered polyvinyl chloride products, without adding machinery, by the use of Monsanto's fast-fusion type plasticizers—Santicizer 141, Santicizer 140 and Santicizer 160. Production increases generally are 33%, but in some cases they go up more than 100%.

This extra volume can be yours without sacrificing quality. In fact, you can get *better* quality. You may add advantages such as flame resistance, low toxicity, improved low-temperature flexibility, grease-and-solvent resistance and other characteristics that will improve your sales.

For information on these production-boosting, cost-cutting, quality-building Santicizers, contact the nearest Monsanto Sales Office or write for a copy of Monsanto's new booklet, "*Increased Capacity Through Faster Processing of Polyvinyl Chloride.*" MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Mo.

Santicizer: Reg. U. S. Pat. Off.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

SANTICIZER

MONSANTO
CHEMICALS – PLASTICS

You are cordially invited to visit the Monsanto Exhibit, Booth 222, at the Fifth National Plastics Exposition, Convention Hall, Philadelphia, March 11-14, 1952.

SERVING INDUSTRY...WHICH SERVES MANKIND

ARMY SIGNAL CORPS

ARMY ORDNANCE

QUARTERMASTER CORPS

NAVY

AIR FORCE

ATOMIC ENERGY COMM.

FACILITIES

- Engineering and design service.
- Modern tool room.
- Compression and plunger transfer molding from 150 up to 850 tons.
- Injection facilities—8 to 32 oz.
- Fabricating, assembly, painting and hot stamping.
- A complete re-design service for scarce metals parts produceable in plastic.

Reporting for D.O. DUTY!

(DEFENSE ORDER)

Industrial Plastics Co. . . . the experienced source for all types of Defense Order contract and sub-contract plastics work.

Complete facilities for compression, injection or plunger transfer molding of plastics.

Dependable, accurate production and on-schedule delivery of molded plastic radio, radar, electrical, electronic and mechanical component parts, helmet liners, mess trays, special tools, containers . . . anything that can be molded in plastic.

Security approval by Army, Navy, Air Force and Atomic Energy Commission.

We're reporting for duty!

Write R. K. Kewley, Sales Manager.
Phone Chicago, Bishop 2-1505.
Representatives in Principal Cities

Industrial Plastics Co.

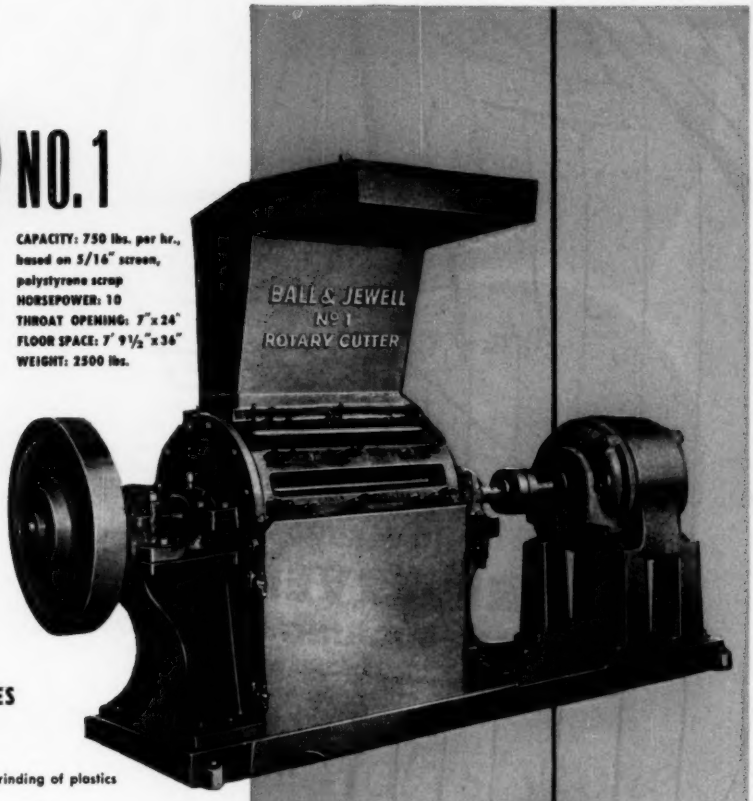
A Division of INDUSTRIAL ABRASIVES INC

Serving the Greatest Names in Industry

1829 S. 55th Avenue Chicago 50, Illinois

NO. 1

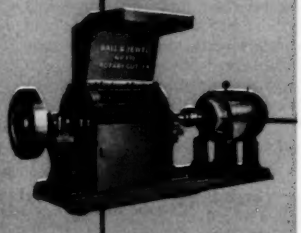
CAPACITY: 750 lbs. per hr., based on 5/16" screen, polystyrene scrap
HORSEPOWER: 10
THROAT OPENING: 7" x 24"
FLOOR SPACE: 7' 9½" x 36"
WEIGHT: 2500 lbs.



SPECIAL DESIGN ADVANTAGES

- For high production grinding of plastics molding scrap
- Low Cost — Medium Duty
- Re-Designed and improved again in 1951 (first model built in 1895).

Require A Smaller Machine?
Ball & Jewell No. ½ T.B.
Throat openings of 5½"x 20" or 8"x 20". Horsepower, 7½. Capacity, 500 lbs. per hr.



Require A Larger Machine?
Ball & Jewell No. 1½
Capacity rating, 1200 lbs. an hr. with 20 horsepower motor. Throat opening of 26"x 8".

Your grinder source for every individual plastic material cutting requirement and capacity (50 to 3,000 lbs. per hr.)—Ball & Jewell, machine tool builders since 1865, have always paced the grinding needs of the plastics industry. Send us your requirement specifications.

BALL & JEWELL, INC. *Leadership Through Continuous Engineering Improvements*

22 FRANKLIN STREET, BROOKLYN 22, NEW YORK

We never laugh in a customer's face — we did once. Why is it that all customers seem to be so big physically?

We use this sleeve for the following informal occasions:

A. Customer finds a molder who promises delivery of a mold in half the time we promise — and gets it later than our promised date.

B. Customer finds a molder who accepts impossible tolerances — and winds up machining the piece — as we recommended.

C. Customer finds a molder who will make the piece "10% less than Boonton" — and has to remove flash and clean each piece after receiving it.

D. Customer finds a molder who promises impossible production per week — and gets it every other week — average delivery less than Boonton.

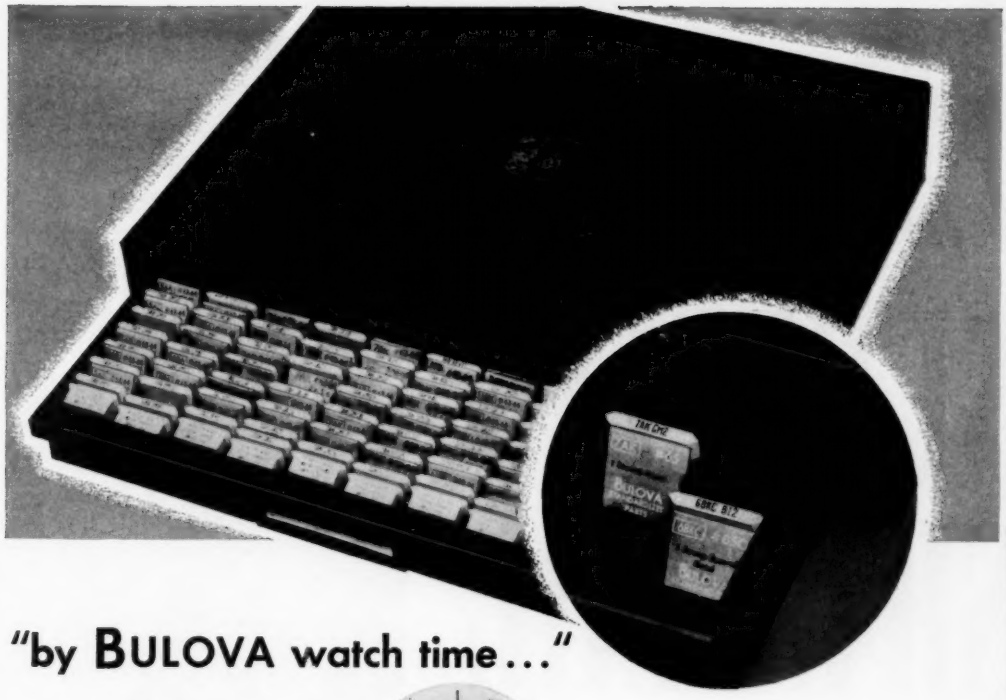
We want business as much as anyone — but we have enough trouble meeting "possibles" without being hanged for promising "impossibles" just to get the order.

Our laughing is done only at midnight, in the back office, and up said sleeve. We are very sympathetic in public — pushingly so.

BOONTON MOLDING CO.

BOONTON, NEW JERSEY

NEW YORK OFFICE — CHANIN BUILDING, 122 EAST 42ND STREET, MURRAY HILL 6-8840



"by BULOVA watch time..."

Koppers Polystyrene

...for precision packaging

● With the same care and regard for precision that they use in watchmaking, Bulova has prepared this parts cabinet for their dealers.

Koppers Polystyrene 81 proved the ideal choice for this new cabinet for several reasons. It offers practical, time-saving advantages and maximum convenience in use. The dividers (also made of Koppers Polystyrene) are easily moved to accommodate changing volumes of stock, and are molded of ivory-colored Polystyrene to make identifying lettering extremely readable and provide quick identification. The handsome mahogany color of the cabinet will always be fresh and new-looking.

Of prime importance is the fact that this new cabinet represents a substantial saving in manufacture and use over a previous metal model which it replaces.

Koppers Polystyrene 81 is a lubricated plastic, well suited for precision molding of this type. Its ease of flow assures that it will fill the mold, giving sharp definition to divider slots and corners, and permitting the molding of thin wall sections. Its improved physical properties plus greater dimensional stability provide a strong, rigid, good-looking cabinet and drawer that fit together perfectly.

• • •

Write for further information about the adaptability of Koppers Polystyrene to your housing or packaging problem. Our technicians are anxious to work with you . . . to design new packages or products to be made of Koppers Polystyrene, and to help you obtain the best possible results in using this versatile plastic.

Koppers Plastics make Many Products Better and Many Better Products Possible.

KOPPERS

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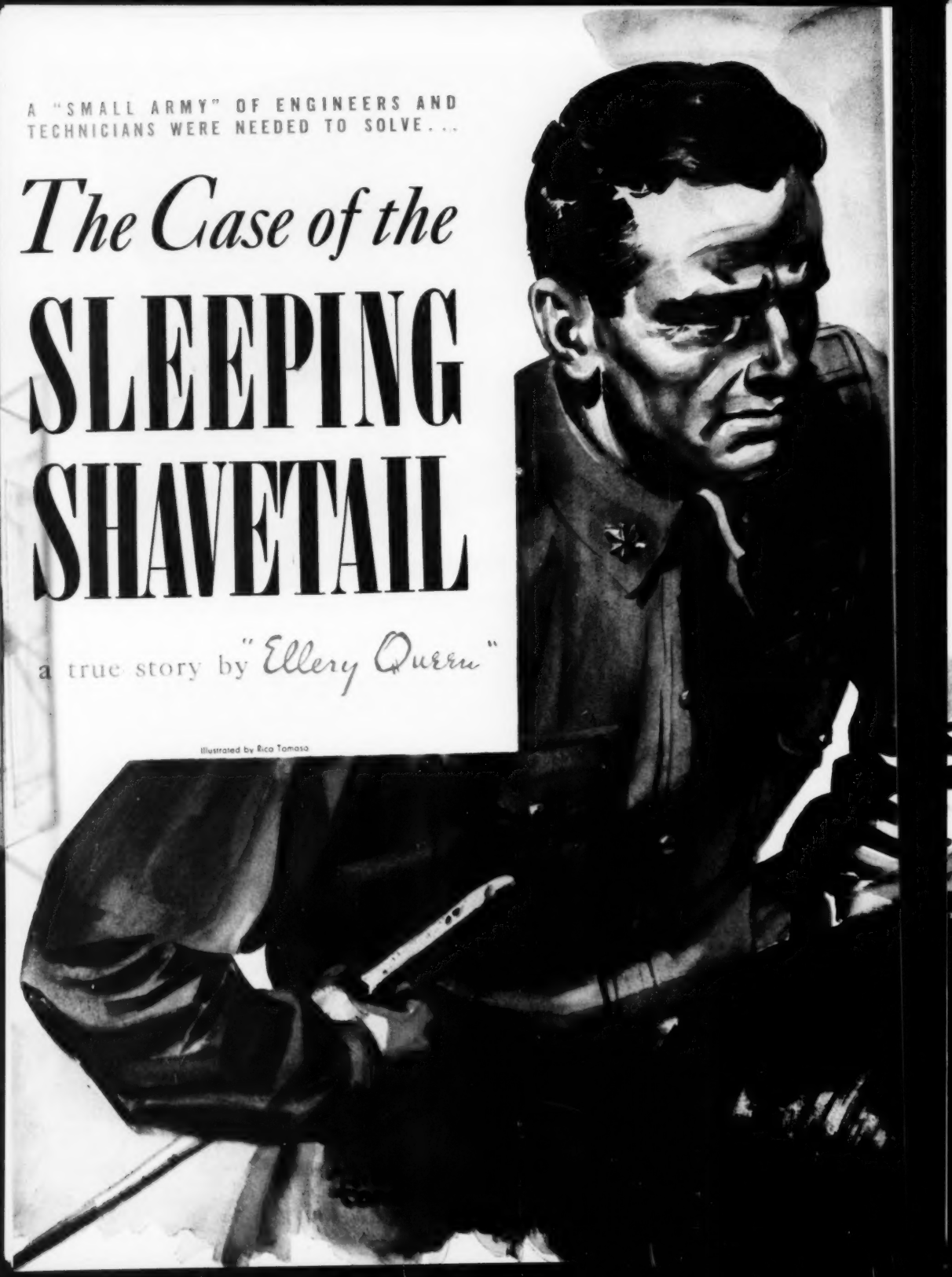
A "SMALL ARMY" OF ENGINEERS AND TECHNICIANS WERE NEEDED TO SOLVE...

The Case of the SLEEPING SHAVETAIL

a true story by "Ellery Queen"

Illustrated by Rico Tomaso



The Major did a slow burn, then exploded.

"Lieutenant!"

In panic, the "shavetail" shot to his feet, blinking foolishly.

"Dammit, Lieutenant, wake up! Get on the ball, learn something about combat tactics!"

But later, the Major decided wearily that he didn't blame the guy for falling asleep. Those training lectures were dull as ditch water. One blackboard talk after another! Why couldn't the material be presented dramatically, made unforgetable?

A few days afterwards, the Major sat in the offices of Pyro Plastics Corporation.

"What I want is action," he explained. "I want to simulate combat conditions, with sand tables, paper-mache terrain and real life-like military vehicles—tanks, trucks, guns—small ones, built to scale. Follow me?"

"Perfectly. Fact is, Pyro has been experimenting for some time with plastic military toys. We've already developed a complete line of military units—trucks, tanks, carry-alls, troops, mobile AA, searchlights, guns, planes and so forth. They're OD color, with U.S. markings and ensignia."

"Those," exclaimed the Major, "are exactly what I want. I need a full complement of units at battalion strength."

The Pyro man smiled. "Major, as far as I'm concerned, that's an order!"

Thus, Pyro was able to serve the needs of the armed forces with their proprietary line of military toys—designed, developed, processed and produced by an enthusiastic team of some 360 seasoned technicians working together towards a common goal: A good product carefully designed, efficiently produced, speedily delivered.

In sum, a sleeping "shavetail" was helped by the now-famous Pyro Front Line Military Toys.

☆ ☆ ☆

Pyro stands ready to serve all industries, with complete facilities for the injection molding of thermoplastic parts and products: Consultation, product creation and design, engineering, molding, research and development. When your production plans call for plastics, let Pyro engineers advise you. Estimates submitted promptly upon receipt of your blueprints and specifications.

STARTING POINT FOR A BETTER PRODUCT

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PYRO PARK, UNION, NEW JERSEY

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Clopay research has made revolutionary progress in the development of precision plastics with material characteristics of the widest versatility.

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- **TUBES**
- **RIBBONS**
- **CHANNELS**
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Round, flat or unusual shapes in a complete range of colors . . . low and high temperature properties . . . hard or soft with required degree of toughness and dielectric strength to meet the most exacting specifications . . . any combination to satisfy difficult requirements for gaskets, mouldings, tubing, electrical insulation and other uses. Clopay Vinyl extrusions are an authentic improvement over rubbers (natural or synthetic) not a substitute.

For specific information write, wire, or phone . . .

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New York: 386 Fourth Avenue, Room 608
Murray Hill 3-8066
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☐ **1.** Fabrication of Vinyl film, supported and unsupported, and Polyethylene film for specialized uses.

☐ **2.** Vinyl coating and embossing of papers and textiles.

☐ **3.** Multi-color printing (surface and rotogravure) for decorative uses and military wrapping and packaging.

☐ **4.** Precision fabrication of extruded and molded parts.

☐ **5.** Precision slitting, electric-eye controlled cutting, die-cutting, electronic and thermal sealing, and high speed production line sewing of plastics.

☐ **6.** Manufacture of cast Vinyl film for applications where uniform high strength and dielectric properties are required.

☐ **7.** Complete Laboratory and Engineering facilities for research and development.

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Now being used successfully in the Plastics Industry, CONOWEVE is an unwoven fabric made from all cotton fibres.

Laminated and molded parts made with CONOWEVE exhibit many desirable physical properties.

Hot or cold punching of parts with critical dimensions and holes, and machining of gears and other parts are an outstanding quality of high pressure laminates made with this material.

CONOWEVE has excellent mechanical and electrical properties equal to, and in many instances even better than, woven cotton fabric base materials.

Available either untreated or impregnated to your specifications.

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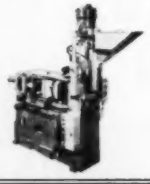
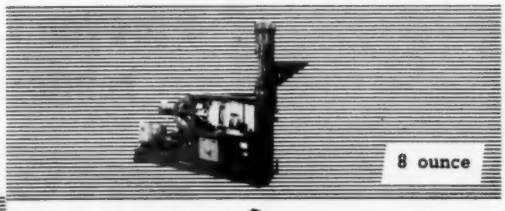
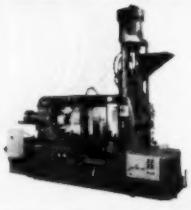


4 ounce

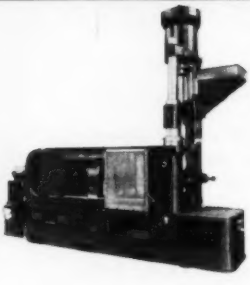


8 ounce

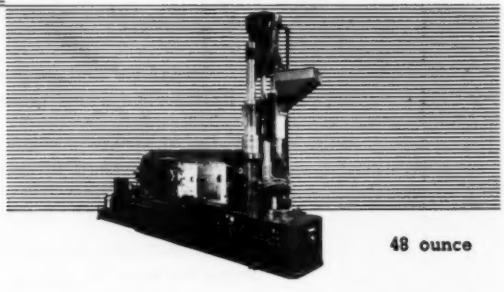
12 ounce



20 ounce



32 ounce



48 ounce

Only Lester Injection Molding Machines, ranging from 4 to 48 ounces, gives you these important features: "TORRID-ZONE" INTERNAL HEAT FOR GREATER PLASTICIZING; ONE-PIECE CAST STEEL FRAME FINISHED WITH DIE-MAKER'S PRECISION; SINGLE POINT DIE HEIGHT ADJUSTMENT; THE VERTICAL INJECTION SYSTEM.

A specially prepared file folder with complete specifications of the machine of your choice is available on request—or check with the representative in your area listed below.

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PLIOVIC A and AR are in use in calendered films and flooring, extruded hose and tubing. PLIOVIC AO is being used in clear and colored unsupported cast films and in coatings for fabrics and papers. In either form, these resins yield tough, high-strength, long-wearing products with good light and heat stability, good chemical resistance and — in the case of films and coatings—with heat seals at 250°F-275°F.

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GOODYEAR
CHEMICAL DIVISION
AKRON 16, OHIO

To Help You Evaluate PLIOVIC

Composition	Vinyl Chloride Copolymer
Form	Fine White Powder
Specific Gravity	1.39
Bulking Values	PLIOVIC A and AR—22 lbs./cu. ft. PLIOVIC AO—15 lbs./cu. ft.
Softening Point	187°F
Moisture Content	2.0% maximum
Intrinsic Viscosity	0.800-0.950
Solubility	Very limited. 12-15% solids solution can be made in ketones at elevated temperatures.
Color	None
Taste	None
Olsen Flow Temperature	296°F — 1 in./2 min. @ 1500 psi

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Barrett is taking steps to expand with America's defense needs, and to help fulfill civilian requirements as well. Besides increasing capacity at Barrett's Philadelphia and Ironton plants, plans are already under way for construction of new phthalic anhydride plants in Chicago and Philadelphia. The Philadelphia plant is expected to produce 36,000,000 pounds of phthalic anhydride annually. It's a huge order, but it's an order Barrett intends to fill.

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
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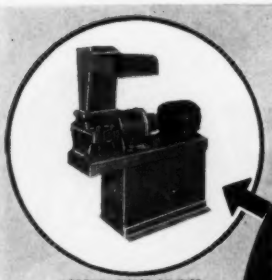
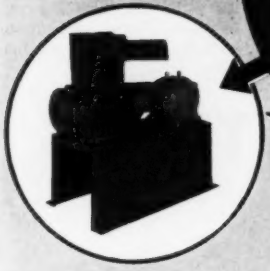
* Reg. U. S. Pat. Off.



MODEL ½, DIRECT COUPLED

MODEL ½, V-BELT DRIVEN

THE GRANULATOR *YOU* NEED is made by CUMBERLAND



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MODEL 10 (6" x 10" THROAT OPENING)

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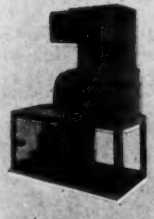
Selecting the *right* granulator for your needs is important! By choosing a machine that's best suited to *your* requirements, you'll save materials, time and money.

To make your selection problem easier, Cumberland has developed a complete line of rugged granulating machines — each designed to excel under specific job conditions. The granulator you need is among them.

Cumberland engineers — backed by a practical understanding of your problems and how to solve them — will be glad to recommend the plastics granulator that's right for you. Write for details today!

For technical information about Cumberland granulating machines, request Bulletin 250.

OTHER CUMBERLAND MACHINES



PREBREAKER

Cuts up radio, television cabinets and other large parts. Two machines available: Model 32 (20" x 32" throat opening); Model 24 (10" x 24" throat opening). Write for details.

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Heavy duty, rugged machine. Used for cutting thick vinylite slabs from two roll mills. Also used as large capacity pelletizer. Other applications are described in Bulletin 400.

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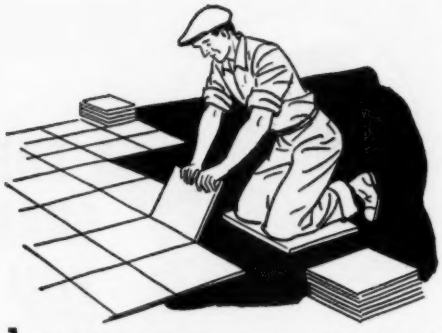

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"Dutch Boy" Stabilizers

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DS-207 (Dibasic Lead Stearate)	Stabilizer-lubricant for sheeting, film, extrusion and molded compounds
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PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
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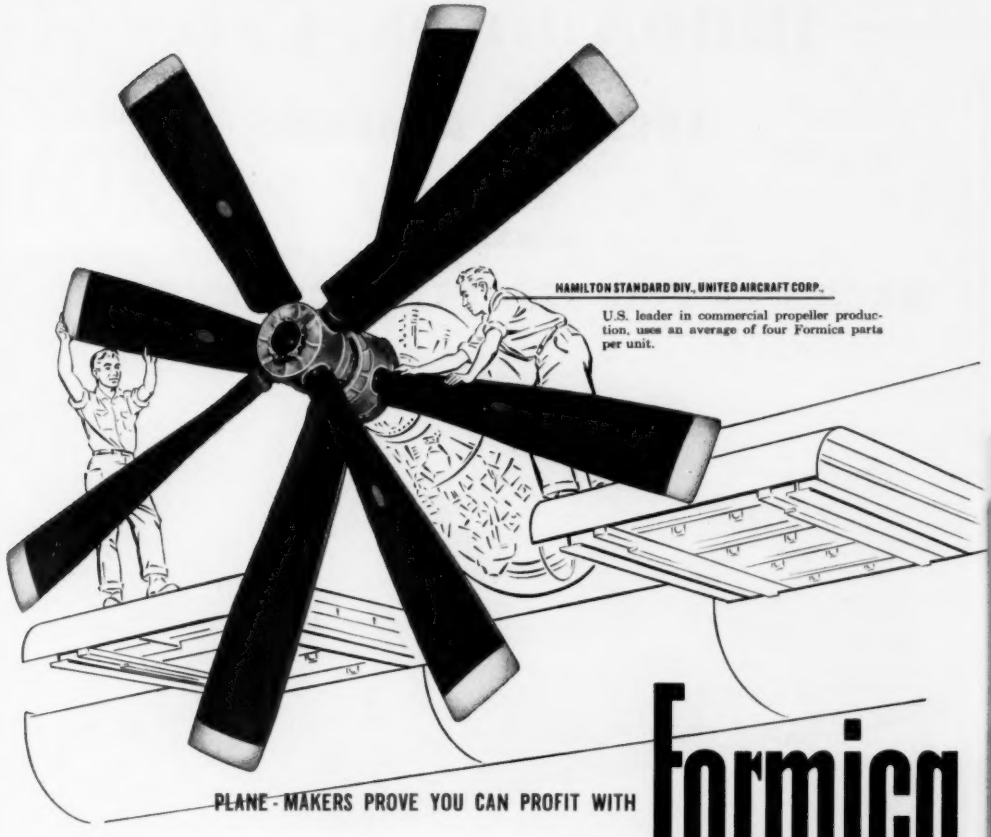

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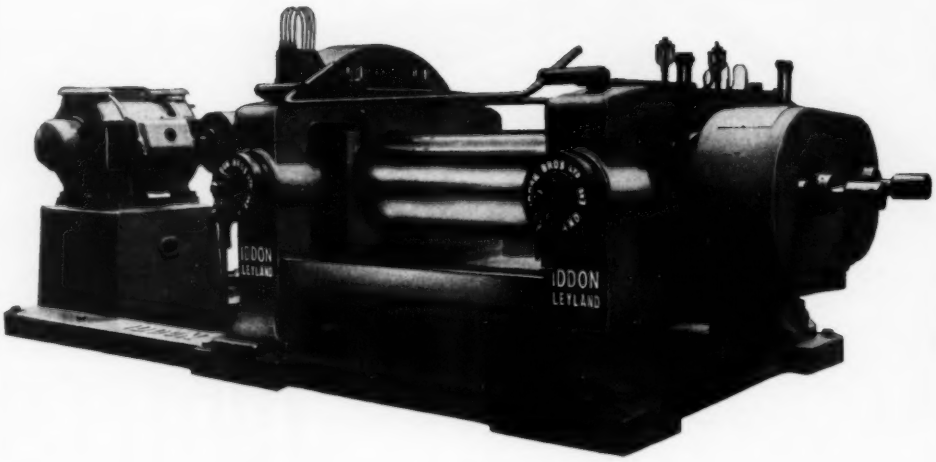

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informative labeling in action!

Information that might mean life or death for atomic workers must stick-and-stay-stuck even to small curved plastic surfaces.

Kum-Kleen pressure-sensitive labels were chosen because of their stickability, ease of application, and low on-the-product cost.

Kum-Kleen labels combined with the new Avery Electric Dispenser are applied at production-line speed—free of expensive equipment costs.

HERE IS AN EXCELLENT EXAMPLE OF INFORMATIVE LABELING IN ACTION, from Landsverk Electrometer Company of Los Angeles. Their Analysis Unit gives scientists and atomic workers accurate readings of the body absorption of deadly radio activity. Because important information must be carried on to the user and remain firmly affixed to the product, Kum-Kleen pressure-sensitive labels were selected. Kum-Kleen labels can be trusted to stick-and-stay-stuck to all types of plastics, even the most difficult-to-label surfaces, to never pop or curl off even when subjected to temperature extremes.

Landsverk is just one of the many, many manufacturers using Kum-Kleen pressure-sensitive Informative Labeling for its positive adhesive qualities, ease of application, and low on-the-product's cost.

Write for samples and prices

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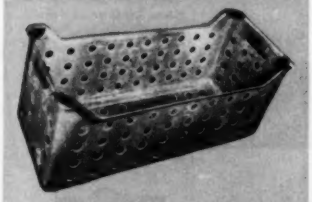
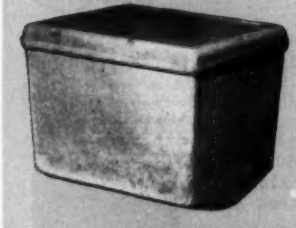


Fruit crate for field, coloring vat and storage. ID 34½" x 14½" x 14". Weight 9 lbs.

Hot water tank. Replaced monel metal. 15" high. Top ID 6¾".



Dishwasher tub. Tub size 24" x 17⅞" x 17½".

You can profit from the wealth of experience gained by Apex over the past five years thru experimentation and production of Fiberglas reinforced thermosetting polyester resins, processed with both Preform and Mat.

We have 5 presses operating—2 more on order, ranging up to 85 ton pressure, 50" stroke, 80" daylight with maximum clearance between posts of 42".

Presses capable of producing flat forms up to 32" x 48" oblong and up to 36" square.

Our fabricating facilities for complete assemblies consist of punching, machining and secondary bonding, after sand blasting.

We have 5 Preform machines in production. Maximum dimensions are: Circular containers 30" dia. x 25" deep. Square containers 25" all dimensions.

Finished wall thickness can be 1/32" to ¾" with thick sections held to a minimum. Side walls require not less than 1° draft for shallow forms and 1½° for deep draws.

We prefer large volume in sizes approximating those shown on this page.

Your engineers are invited to consult us on all problems where our product can possibly replace other materials.

Outer shell 2-part washer. OD 23⅞". Height 9⅜".

Inner shell for above.

Outer shell for washer. OD at bottom 23¼". Height 12". Thickness of wall only 1/16"

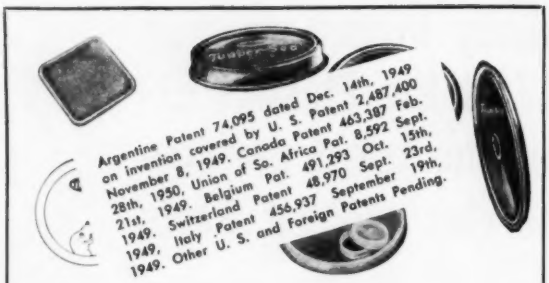
THE APEX ELECTRICAL MFG. CO.

FIBERGLAS MOLDING DIVISON

7426 BESSEMER AVENUE **Michigan 1-0472** **CLEVELAND 27, OHIO**

Several of above parts are used in our appliances.

Tupper Seal, air and liquid tight flexible covers fit, and are included in the sets of all Tupperware Canisters.



Argentine Patent 74,095 dated Dec. 14th, 1949 on invention covered by U. S. Patent 2,487,400 November 8, 1949. Canada Patent 463,387 Feb. 28th, 1950. Union of So. Africa Pat. 8,592 Sept. 21st, 1949. Belgium Pat. 491,293 Oct. 15th, 1949. Switzerland Patent 48,970 Sept. 23rd, 1949. Italy Patent 456,937 September 19th, 1949. Other U. S. and Foreign Patents Pending.

TUPPER / Seals

air and liquid-tight, flexible covers for Tupperware Tumblers, Canisters, Wonder Bowls, Cereal Bowls and many another container of glass, metal and pottery, the contents of which it is desired to keep fresh and wholesome.

TUPPER /

There's a Tupper Seal, air and liquid-tight flexible cover for Tupperware 2, 5, 8 and 12½ oz. Tumblers too, and these Tupper Seal, covers fit many other containers of metal, glass and crockery.

The Tupper Seal, air and liquid-tight flexible Por Top cover, specially designed as a dispensing cover for specified diameters of containers holding foods such as syrups, salad dressings, catsup.

The Tupperware 50 oz. Canister is "standard equipped" with the Tupper Seal, air and liquid-tight flexible Pour All cover.

The Tupper Seal, air and liquid-tight flexible Pour All cover is used on every Tupperware 20 oz. Canister.

FORMAL NOTICE! 9th November, 1949

EXCLUSIVE!

U. S. Patent #2,487,400

The Tupper Corporation has attained a position of leadership in this industry by incurring great expense and expending painstaking effort in the development, design, manufacture and exploitation of its many world-known products.

The Tupper Corporation further has anticipated the inevitable attacks to which leadership is subject and has taken measures provided by law to preserve the creative rights to its products, methods and design by patent protection both in the United States and abroad.

Tupper Seals for Tupperware shown in this advertisement are just a few of the forms covered in this manner and are specifically covered by U.S. Patent #2,487,400.

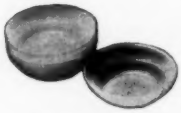
Only the Tupper Corporation, by U.S.Patent #2,487,400 has the right to make, use and vend container closures in connection with any and all types of containers throughout the United States and its territories as covered by the claims of the Patent.

Tupper Corporation will protect, according to law, the exclusive rights above granted

TUPPER CORPORATION

The cover of the Tupperware Bread Server which serves as a bread tray also is designed to give similar results as Tupper Seal, air and liquid-tight Flexible covers. Keeps contents fresh as no other such container.

The Tupper Seal, air and liquid tight, Pour All cover as a cover for 46 oz. cans; Tupperware Sauce Dishes and other containers of metal, glass or pottery. Foods easily dispensed without removing entire cover.



When equipped with Tupper Seal, air and liquid-tight, flexible covers, Tupperware Cereal Bowls serve many another purpose.

The Tupperware Wonder Bowls are usually fitted with Tupper Seal, air and liquid-tight covers.

The Tupper Seal, air and liquid-tight flexible cover made for Tupperware 8 oz. Tumblers also fits and is sold with all Tupperware Funnels as a base when funnels are used as storage containers.

TUPPER CORPORATION

Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

FACTORIES: Farnumsville, Mass., and Cuero, Texas New York Show Rooms 225 Fifth Ave.

ADDRESS ALL COMMUNICATIONS TO: Department M-3

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PITTSBURGH PX PLASTICIZERS

Give You All Three!

5th NATIONAL PLASTICS EXPOSITION PHILADELPHIA MARCH 11-14 1952

Pittsburgh PX Plasticizers give you the high degree of permanence, low temperature flexibility and compatibility you want in your plastic products. And you can *depend* on these advantages in every shipment.

As a basic and integrated producer, we're able to closely control the quality and uniformity of Pittsburgh PX Plasticizers from coal to finished product—a factor that assures you better performance and more consistent results.

Because of the great demand for plasticizers today for both military and civilian use, we're expanding our production facilities to help meet these needs. We'll be glad to send you samples and specification sheets or provide any technical assistance you require. *Write today!*

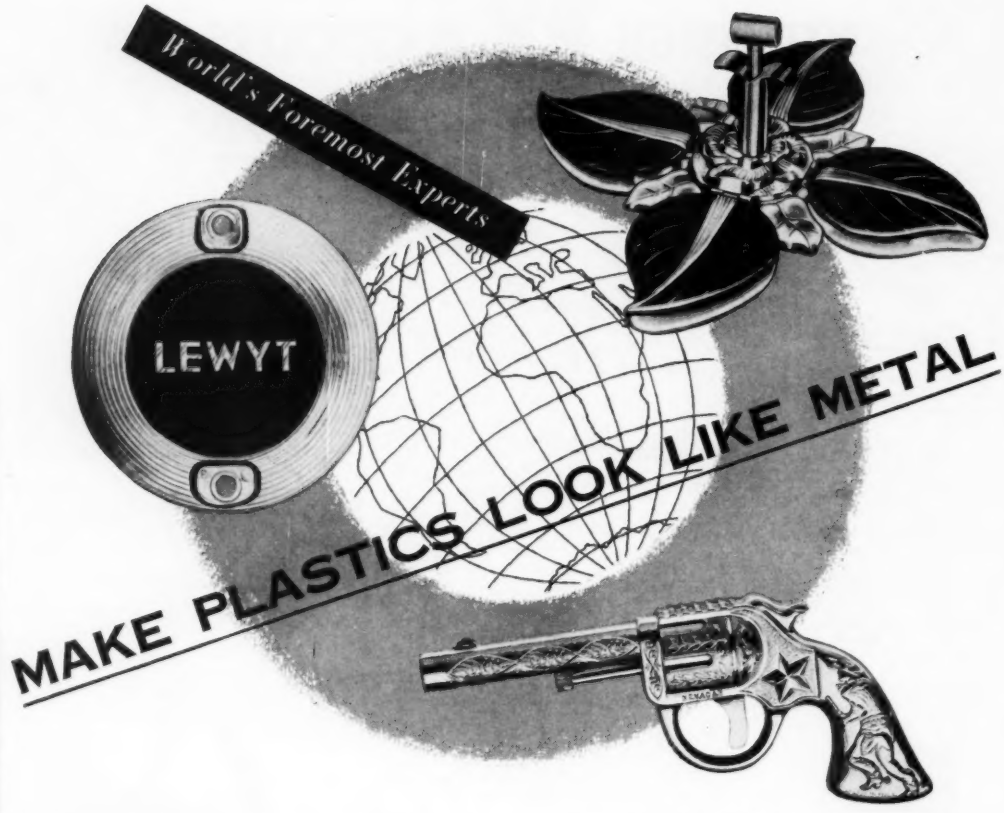
Visit us at Booths 137-139, Fifth National Plastics Exposition, Convention Hall, Philadelphia, March 11-14, 1952

PX-104	DiButyl Phthalate
PX-108	DilsoOctyl Phthalate
PX-138	DiOctyl Phthalate
PX-208	DilsoOctyl Adipate
PX-238	DiOctyl Adipate
PX-404	DiButyl Sebacate
PX-408	DilsoOctyl Sebacate
PX-658	TetraHydroFurfuryl Oleate
PX-917	TriCresyl Phosphate

WBD 3953

PITTSBURGH COKE & CHEMICAL CO.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON



First...a trickle. Then...a trend. NOW...an avalanche. Companies everywhere, manufacturers of every sort of plastic products, are getting on the metallizing bandwagon...having Metaplast Process give their items metallic finishes that shine and gleam like the McCoy, yet cost infinitely less.

In their modern new plant, Metaplast Process, the pioneer of the industry, devotes more area and equipment to metalizing than any other organization in the United States. Hundreds of satisfied customers attest the unexcelled quality of Metaplast's work and the reliability of Metaplast's deliveries.

Discover what all the shouting is about. Find out how inexpensively your plastic products can be made better looking, can command more sales and higher prices. Metaplast Process will supply full details without obligation.

Factory and Office:
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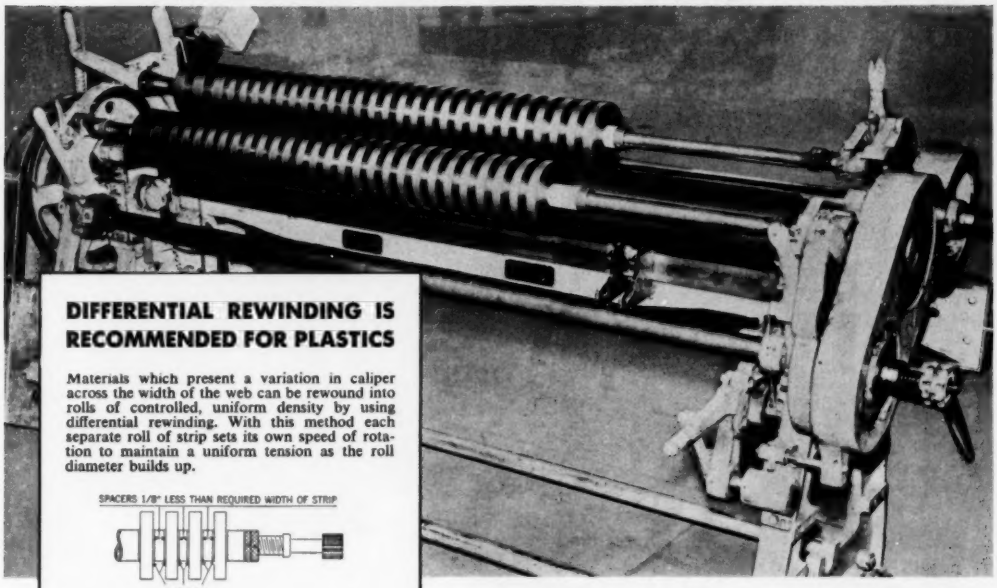
Phone: HAvemeyer 6-9843

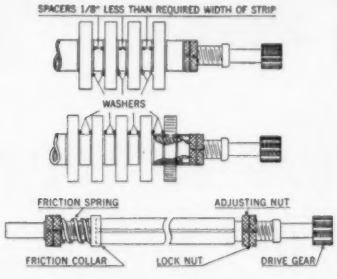
Metaplast
PROCESS, Inc.
PIONEERS OF MASS-PRODUCED METALIZING

VERSATILE CAMACHINE SLITS PAPER, TEXTILES AND PLASTIC FILM



DIFFERENTIAL REWINDING IS RECOMMENDED FOR PLASTICS

Materials which present a variation in caliper across the width of the web can be rewound into rolls of controlled, uniform density by using differential rewinding. With this method each separate roll of strip sets its own speed of rotation to maintain a uniform tension as the roll diameter builds up.

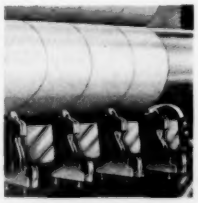


With differential rewinding the separate strips are rewound in alternate positions on two separate rewind shafts. Each strip is wound on a separate core, and the cores are separated by spacers and washers. The washers are keyed to a longitudinal groove in the gear-driven rewind shaft and rotate with the shaft. Axial spring pressure on cores, spacers and washers is sufficient to transmit the driving force from the shaft-keyed washers to the cores. This axial pressure is adjustable and not sufficient to lock the cores, each of which can slip independently as the diameter of its roll builds up. Thus, a roll which is winding at a point where the caliper of the web is greatest will build up its diameter more rapidly. The slight increase in tension due to the larger diameter will cause the core to slip, slowing its speed sufficiently to correct the tension.

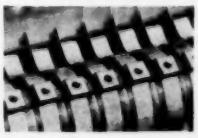
Efficient application of the principles of differential rewind depends on several factors, such as required tension, characteristics of the material, speed of rewinding, width of strips, etc. For best results, call on Camachine engineers.

AA-249

THIS MODIFIED CAMACHINE 26-3A features differential rewinding and combines score-cut and razor-blade slitting. Web speeds range up to 400 fpm. Exceptional trim width of 75" was specially provided for this user.



For paper, textiles and heavy gauge plastics the standard Camachine score-cut method of slitting is used. In this method the slitter units are spaced as required across the width of the machine. The web of material passes over a hardened steel platen roll and is separated by the pressure of the cutter wheels against the surface of the platen roll.

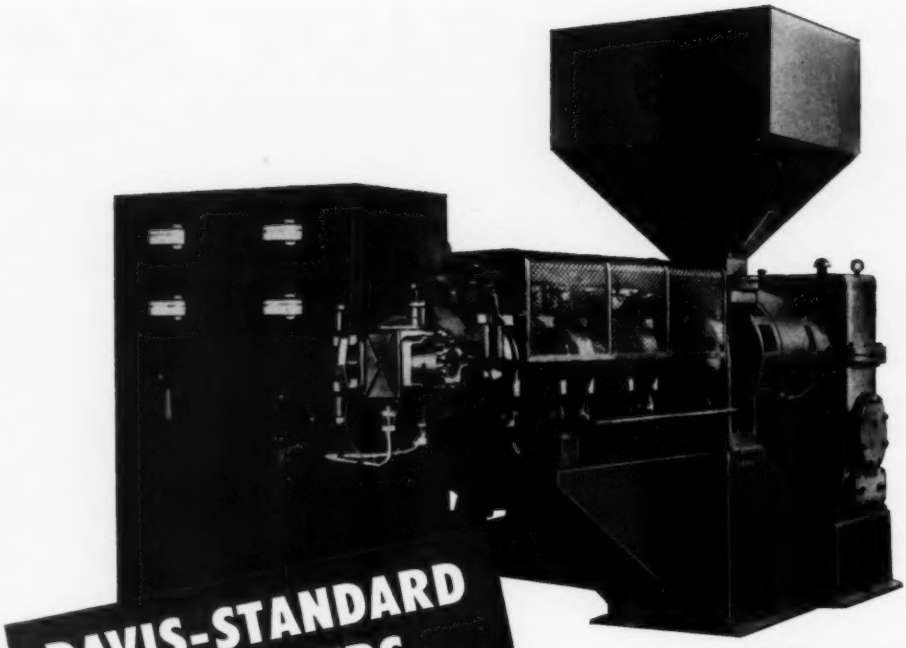


For light gauge plastics. The machine is equipped with an auxiliary razor blade slitting element. Razor blade slitting is used on plastic film ranging up to .010 acetate. Foot pedal control is provided at both the front and the rear of the machine.

CAMACHINE ENGINEERS will be happy to consult with you regarding faster production of top quality rolls of any material.

Cameron Machine Company • 61 Poplar Street • Brooklyn 2, N. Y.

Consider the FACTS and you'll wind up with Camachines®



Davis-Standard 6"
Thermoplastic Extruder

DAVIS-STANDARD EXTRUDERS

...ENGINEERED TO YOUR OPERATING NEEDS

Every feature of our extruders for rubber or plastics is the result of long experience in the extrusion industries and intimate knowledge of production problems.

Davis-Standard "Stream-Flo" insulating heads permit the most efficient operating velocities. All head equipment is compact, accessible and easy to clean. For thermoplastic applications, sectional-type cast steel cylinders afford precise temperature control as well as maintenance advantages. Each section has wear and corrosion-resistant liners.

Another exclusive feature of Davis-Standard plastic extruders is the "Therma-Fin"* heating jacket, with range-type tubular heating elements and stainless steel cooling coils cast into aluminum cooling fins.

*Patent Pending

With this construction any desired temperature condition may be obtained.

Feed section is a separate casting. Stock screws are of special steel alloy, normally bored for water cooling. Variations for depth and lead are available for different compounds. Drive is V-belt or flexible coupling to enclosed worm reduction gear. Davis-Standard machines are furnished complete, including control panel, ready for installation.

Our engineers will welcome the opportunity to work with your engineers on your problems. Our extensive experience in custom-built equipment will fit the installation to your exact requirements.

THE STANDARD MACHINERY COMPANY

MOLDING PRESSES AND EXTRUSION MACHINES
WORLD'S LARGEST MANUFACTURERS OF CUSTOM-BUILT EXTRUSION MACHINES
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Export Office: Ballagh & Thrall, Independence Square, Philadelphia 6, Pa.

Overlooking profitable molding markets?

FLEXIBLE THINKING CAN UNCOVER NEW POSSIBILITIES!

Did you know that *you*, with your plant's present equipment, can compete for a good share of the market for flexible products? You can with VINYLITE Brand Plastic flexible molding compounds! These amazing materials enable you to sell fields that are wide open for development . . . bring new profit possibilities within reach.

This unique check list of properties will tell why.

They're *flexible* to almost any degree from soft and rubbery to semi-rigid. They withstand long flexing without cracking.

They're *handsome*. Every color of the rainbow is here . . . in transparent, opaque or translucent form with a smooth, lustrous finish.

They're *durable* . . . non-fading, abrasion-resistant . . . deliver extra long service.

They resist *oil, most chemicals*, corrosive atmospheres, greases, water, alkalis.

They're *adaptable* to high speed injection molding or extrusion. The temperature range for successful molding is highly flexible.

A little thought will immediately bring to mind dozens of civilian and military applications where these properties can do a job . . . better, faster, more economically. And your organization has the equipment to put them to work! Your first step is to send for 24-page illustrated booklet containing present applications and complete technical data. Write for "VINYLITE Resins and Plastics—Extrusion and Molding Materials." Address Dept. MA-7.

Freezer gaskets make use of low temperature flexibility and wearing qualities of VINYLITE Plastics flexible compounds.

Current successful applications for VINYLITE Plastic Flexible Compounds

Vacuum cleaner bumpers injection molded of VINYLITE Elastomeric Plastics. Quickly produced, attractively colored, easily attached. Tough, flexible, resist impact, abrasion, won't mar furniture.

Vinylite
BRAND
PLASTICS
TRADE MARK

VINYLITE Brand Plastics • BAKELITE Phenolic Plastics • BAKELITE Styrene Plastics • BAKELITE Polyethylene Plastics

BAKELITE COMPANY "The foremost maker of the foremost plastics"

A Division of Union Carbide and Carbon Corporation UCC 30 East 42nd Street, New York 17, New York

Coming Soon...

REET

VINYL PLASTIC FILM IN "LAY-FLAT" TUBULAR FORM

Versatile, flexible, heat sealable, and with improved tear strength and other physical properties, REET vinyl film will soon be available on rolls in seamless tubular form in a variety of widths, thicknesses, and formulations (general purpose, non-toxic, military and other special applications) to meet every packaging requirement.

Extruded REET will also be available on continuous rolls in:

unfolded single sheet form, single sheet folded down the center, or unfolded double-sheet form.

These new products will soon join the popular REET family of calendered unsupported vinyl film and sheeting in embossed and calender-finishes —tailored for your needs in general purpose as well as other special formulations designed to meet your particular requirements.

At The 5th National Plastics Exposition March 11-14 Convention Hall, Philadelphia **BOOTH 604**

If it's REET® it's right!

At The 21st National Packaging Exposition April 1-4 Public Auditorium, Atlantic City **BOOTH 919**

ROSS & ROBERTS, Inc.

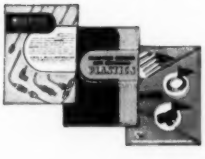
Stratford, Conn. West Haven, Conn.

ROSS & ROBERTS SALES CO., INC. • 350 Fifth Avenue, New York 1, N. Y. • LO 3-5184

Sales and Technical Field Representatives

Comfortable Driving is a Matter of Molding

Thanks to our latest automobile accessory molding job, motorists can now drive comfortably with their windows open in all kinds of weather—and they can drive without discomfort from sun or electric light glare. Since this Tenna-Lite visor will be exposed to all kinds of weather—it had to be molded in a rugged manner. Durability was further achieved by sealing in the metal attachment clips during the molding operation instead of putting them on the outside. Visibility demands played a role in the selection of a material that would be translucent but free of distortion or shadow and whose color remained constant. Economical production also had a very prominent place in the picture. Every plastic product, automotive or otherwise, that is brought to us for molding is given the same careful treatment. Functional demands are viewed from every angle. Then sales appeal is brought into balance. The result is a product that meets your every demand and at a reasonable cost. Let us prove it to you today without obligation.



Write on your letterhead for new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about [redacted], piping, tubing and fittings, write for circulars containing data and illustrations. *Trademark Registered*

ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Fibestos, Lucite, Nylon, Plexiglas, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Forticel, [redacted]*, Saran, and other Thermoplastic Materials.

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

Tenna-Lite Plastic Door Visor, molded for Tenna-Lite Corp., Chicago

Plastics

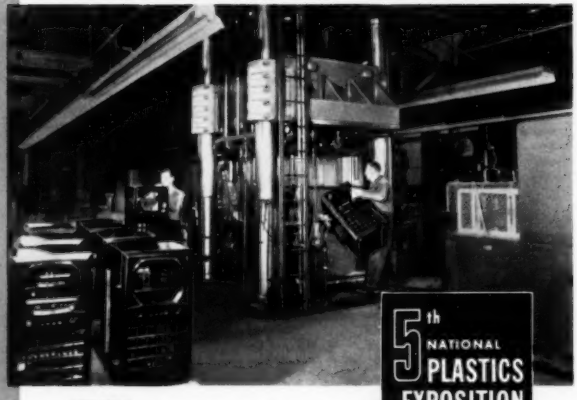
CUSTOM-MOLDED by MPc

Everything from the Smallest Parts to the Largest Available Anywhere...

Tiny or giant size, molded plastic parts are finding ingenious new applications...especially since the pinch on hard-to-get metals. Forget yesterday's limitations on the use of plastics! Investigate the new molding materials, the new reinforcing materials...and the new molding techniques developed at **MPc.**

Here at **MPc,** hard-to-handle molding problems are met with inventive engineering skill...supported by unmatched molding and tool-room facilities. The 17 inch television cabinet, complete with slide louvers, assembly holes, mounting rails and studs is produced in a single economical operation. The record player cabinet is made in three pieces that align perfectly for easy assembly. Metal inserts are accurately molded into the small knobs. Submit your plastics product or problem to:

MOLDED PRODUCTS CORPORATION
4535 W. Harrison St., Chicago 24, Ill.



FREE "Data Book of MPc Facilities," an engineering-eye view of **MPc** production facilities...together with a survey of **MPc** special skills available for your use. Write for your copy.

5th NATIONAL PLASTICS EXPOSITION
PHILADELPHIA
MARCH 11-14
SPI 1952
Booth 437-439

PLASTICS DIVISION
MOLDED PRODUCTS
CORPORATION

...Pace-Makers in Plastics Molding

NOT A LAMINATE,

THIS is a plastic molding compound!

It is one of the FIBERLOYS by Rogers. Ten years ago, Henry Ford made part of a car body from it. Build a big enough press, and you can make entire car bodies from it. Today it is specified in certain military contracts. Tomorrow, we'd like to create a variation of it to meet your special requirements.

PLASTICS by Rogers are special purpose, impact phenolics. They include the only molding compounds produced in sheets. They provide the most efficient, least expensive method of using high impact molding materials. Some are furnished in bulk form for molding. Some are special purpose laminates.

OTHER FIBERLOYS include the exciting new DUROIDS. These are special formulations developed to supply specific mechanical and chemical characteristics. The DUROIDS blanket the range of materials properties from laminated plastics, down through vulcanized fibre to paperboard.

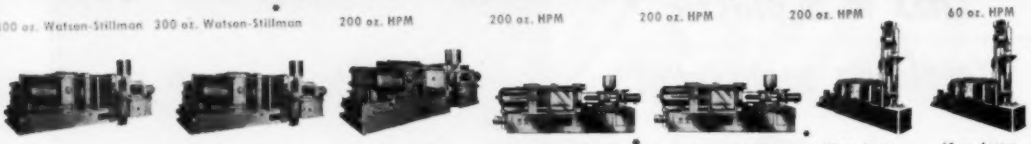
USING FIBERLOYS results in better parts for better products. Many of them are fabricated to customer specifications by Rogers' Fabricating Division.

Better Parts for Better Products

ROGERS
CORPORATION
Established in 1832

AN ENTERTAINING BOOKLET **— "Here's Rogers and its Fiberloys" will help you decide whether you have a place for the FIBERLOYS. Please write for it, to Dept. P, Rogers Corporation, Manchester, Connecticut.**

300 oz. Watson-Stillman 300 oz. Watson-Stillman 200 oz. HPM 200 oz. HPM 200 oz. HPM 200 oz. HPM 60 oz. HPM



60 oz. HPM 60 oz. HPM 50 oz. HPM 48 oz. Watson-Stillman 48 oz. Watson-Stillman 48 oz. Lester 48 oz. Lester

32 oz. Watson-Stillman 32 oz. Watson-Stillman 32 oz. Reed-Prentice 32 oz. HPM 32 oz. HPM 24 oz. Reed-Prentice 24 oz. Reed-Prentice

20 oz. Lester 20 oz. Lester 20 oz. Lester 20 oz. Lester 20 oz. Lester 16 oz. Reed-Prentice 16 oz. HPM

12 oz. Reed-Prentice 12 oz. Reed-Prentice 12 oz. Lester 12 oz. Lester 12 oz. Lester 12 oz. Lester 12 oz. Lester

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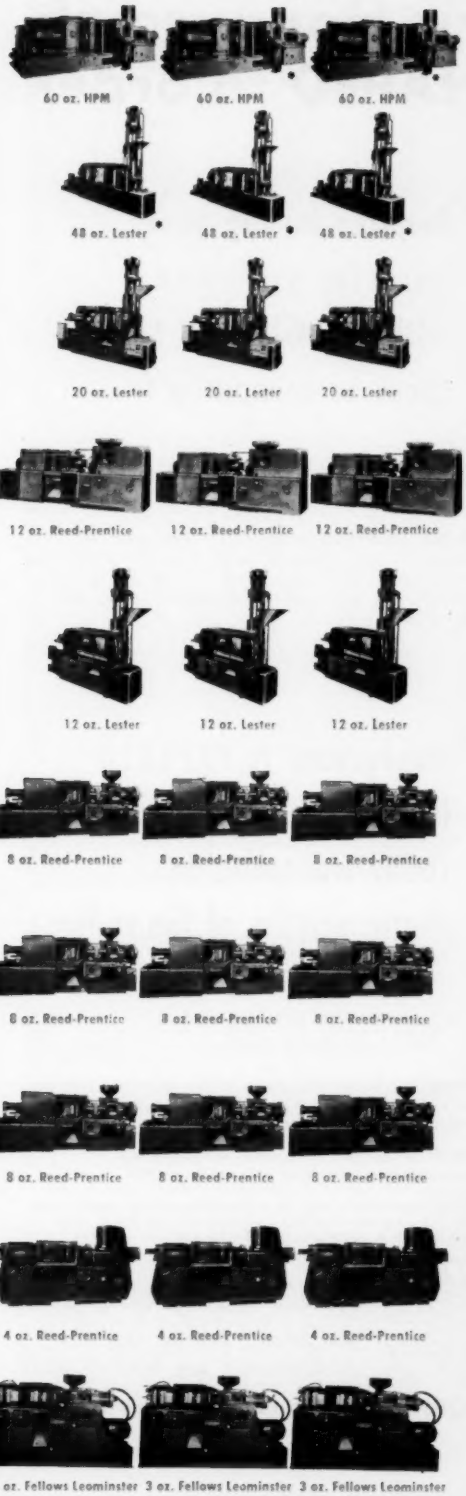


bring your D.O. INJECTION MOLDING to *Ideal*

Appraised solely on the basis of molding machine pr ductive capacity (the one hundred machines shown here* Ideal Plastics *must be considered* when you have anythi to be injection molded.

But there's more to the Ideal picture than meets the ey There's Ideal's two multi-million dollar toolroom equipped to machine any mold that will fit an injectio press. There's Ideal's 25-man engineering staff with lite ally thousands of satisfactory jobs behind them. There Ideal's 3000-plus labor force—skilled molders and mol makers, experienced assemblers and finishers, inspecto and packers.

It will cost no more—yes, it will probably cost less— have your job molded by the best equipped, mightie injection molder of them all. Your inquiry will bring prompt response. Write to A. C. Manovill, Vice-Presiden in Charge of Sales. Ideal Plastics Corporation, 184-10 Jamaica Avenue, Hollis 7, New York. Phone: AXtel 7-7000. Mid-west Representative, Steel Mill Products Co., 176 West Adams Street, Chicago 3, Illinois. Phone: CEntral 6-5136.

*All machines will be installed and operating by Spring, 1952.

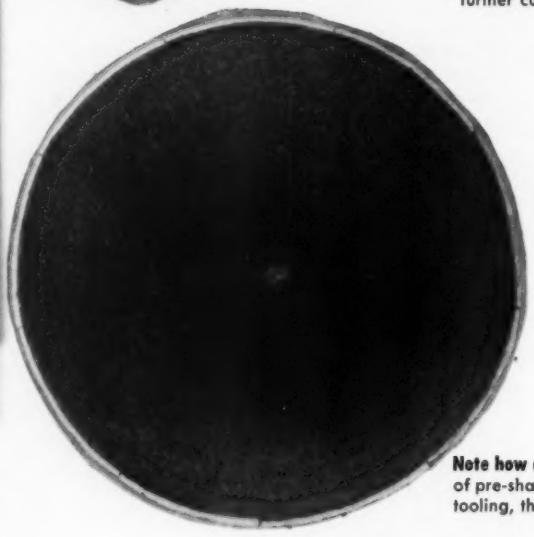
Better Molded Plastics — *for Productive Capacity & Home*

HEXCEL Glass Fabric Honeycomb now PRE-SHAPED to order

Diameter: 33"
Depth: 35"

Reduces lay-up time, increases production without additional tooling, space or manpower!

Pre-Shaped Hexcel Honeycomb for the nose radome (left) of North American Aviation's F86D Sabre is supplied by California Reinforced Plastics Company in thirteen identical slices and one nose-piece per dome. Slices are ready for immediate lay-up with no further cutting or waste.



Honeycomb is TAPERED in thickness to improve radar transmission characteristics of the radome

Note how accurately pieces fit into place in photograph at left. Use of pre-shaped Hexcel Honeycomb results in higher output with same tooling, thus substantially lowering production costs.

PRICES ON QUOTATION. Curvature and cutting dies developed from reject outer skin or female mold.

Hexcel Glass Fabric Honeycomb is used in the following aircraft: Convair B-36, RB-36, T-29, XP5Y-1; Boeing B-47; Canadair F-86; Douglas F-3D, AD4N; Grumman AF2W; Lockheed P2V5, PO1W; North American Aviation F-86D.

California Reinforced Plastics Company

Hexcel STRUCTURAL HONEYCOMB in ALUMINUM and GLASS FABRIC

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Booth 436 at the Plastics Show

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WE BUY ..... THERMOPLASTIC SCRAP — all types and forms: Polystyrene, Vinyls, Nylon, Ethyl Cellulose, Polyethylene, Acetate, Butyrate, Acrylics.

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WE EXTRUDE ..... any flexible or rigid formulation which you plan, for any special-shaped Belting, Binding, Edging, Rods, Tubes, Film, Strips . . . in Polystyrene, Cellulose Acetate, Polyethylene, Vinyl, Butyrate, Ethyl Cellulose, Acrylics.

30 Years' Expert Know-How and Large Facilities Are Your Guarantee of Complete Satisfaction

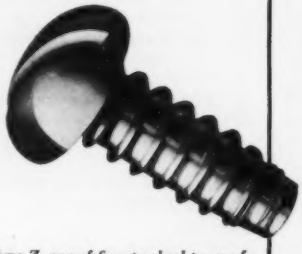
DRYCOL —offered as Gering's perfected dry coloring medium for in-plant coloring of ALL PLASTICS. No special skill or equipment needed. Standard, Special and Metallic colors available or to order.

GERING *Products Inc* KENILWORTH, NEW JERSEY

This man can show you . . .

How to replace "*specials*" with *standards* to speed assembly

Assembly costs were lowered 35% by using two standard P-K Type Z Screws to fasten plastic socket to metal base of this lamp, and also to serve as pivots permitting 180° sweep of socket. Both screws are driven into a concealed coil spring which has same pitch as screw thread, avoiding special screws.



Type Z, one of five standard types of P-K Screws—also available with Phillips Recessed Head.

Ask a P-K Assembly Engineer how you can simplify and speed up your assembly operations by using *standard* Self-tapping Screws instead of hard-to-get "specials". Since P-K makes a complete line, chances are one of the several *standard* types of P-K Self-tapping Screws will meet your needs exactly.

With the experience of more than a million applications to guide him, he can quickly find the answer to this, and other questions you may have about making your assemblies better, faster, and at lower cost.

Today, more than ever, the P-K Assembly Engineer is a good man to have on your production team, helping you boost output and hold down the lid on costs. He'll call at your request. Parker-Kalon Corporation, 200 Varick Street, New York 14.

Your INDUSTRIAL SUPPLY DISTRIBUTOR . . . *your local source for P-K Screws . . . works side by side with the P-K Assembly Engineer. Their combined efforts are solving many difficult problems of planning and procurement. Let them help you.*

P-K TRADE MARK REG. U.S. PAT. OFF.

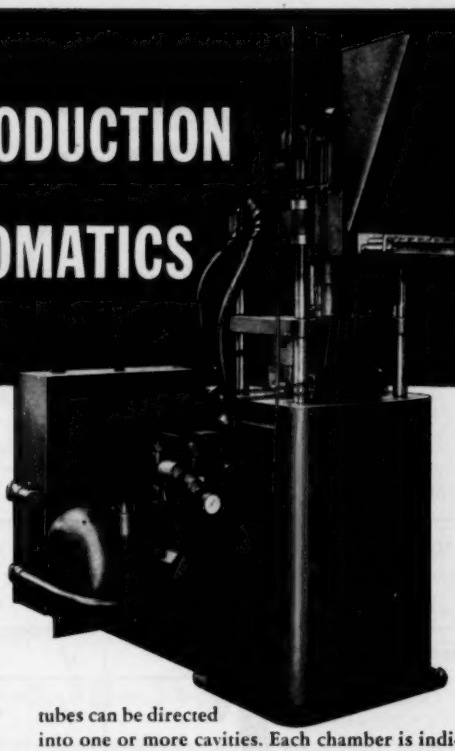
PARKER-KALON®

The Original **SELF-TAPPING SCREWS**

FOR EVERY METAL AND PLASTIC ASSEMBLY

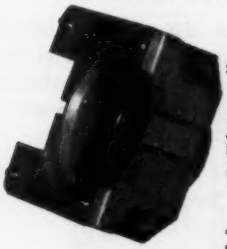
HIGH VOLUME PRODUCTION

BAKER AUTOMATICS



Baker automatics are completely self-contained including the hydraulic system. All that is required is a 220/440 volt line and an 80 to 100 pound compressed air supply. Compare the Alkyd cycle time of 4 seconds plus cure or the Phenolic cycle time of 12 seconds plus cure, including automatic feeding, controlled closure, breathe cycle, automatic opening and ejection of finished part with any other machine on the market.

The Baker automatic 8 cavity feed which is interchangeable on the 15 or 30 ton press offers further saving of production time through its adaptability to different sized cavities in the mold. Change-over time usually takes no more than 20 minutes. The 8 feeder tubes are attached to the feeder block with ball and socket joints so that the tubes can be directed into one or more cavities. Each chamber is individually adjustable making it possible to feed up to 8 different sized cavities at the same time. Baker 15 and 30 ton automatics can also be run semi-automatically in order to accomplish insert molding as shown in the illustration. Write for catalog.



Scale: ¼ actual size

*Cycle time in Alkyd, 4 seconds plus inserts plus cure. Cycle time in Phenolic, 12 seconds plus inserts plus cure. (See part at left)

*Cycle time in Alkyd, 4 seconds plus cure. Cycle time in Phenolic, 12 seconds plus cure. (See parts below).

SPECIFICATIONS

	Model 833	Model 835	Model 938
Capacity (tons) molding pressure	15	15	30
Platen area	11 x 16	11 x 16	11 x 16
Floor area	25 x 56	25 x 56	25 x 56
Stroke	8"	8"	8"
Daylight (adjustable strain rod nuts)	25 to 15	25 to 15	25 to 15
Overall height	87"	87"	89"
Weight	2500	2530	2700
Hydraulic cyl.	4½	4½	9
Hydraulic working pressure (max.)	2000	2000	3000
Air consumption (auxiliary) cu. ft. per stroke	.7	.7	.7
Closure speed (inches per minute)	400	20 to 400	20 to 400
Machine cycle time, seconds plus cure	4	4 to 12*	4 to 12*
8 cavity feeder—8 chambers individually adjustable—max. charge per chamber	21	21	21
Multiple shooting of feeder	No	Yes	Yes
Mold changeover time—old out, new in	20 min.	20 min.	20 min.
Automatic operation	Yes	Yes	Yes
Semi-automatic operation (inserts, etc.)	Yes	Yes	Yes

BAKER BROTHERS, INC., Toledo 10, Ohio

PRODUCTION MACHINERY . . . SINCE 1867

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PLAX HAS MORE METHODS TO DO MORE THINGS WITH PLASTICS

	BLOWING		EXTRUSION				FABRICATING	MOLDING	
	SIZE ⅛ OZ.—PT.	SIZE QT.—13 GAL.	ROD	SHEET	TUBE	FILM	MACHINED PARTS	INJECTION	COMPRESSION
POLYETHYLENE	✓	✓	✓	✓	✓	✓	✓	✓	✓
POLYSTYRENE	✓		✓	✓	✓	✓	✓	✓	✓
KEL-F			✓	✓	✓		✓	✓	✓
METHACRYLATE			✓	✓	✓		✓	✓	
CELLULOSE ACETATE BUTYRATE	✓		✓	✓	✓		✓	✓	
CELLULOSE ACETATE	✓	✓	✓		✓		✓	✓	
ETHYL CELLULOSE	✓		✓		✓		✓	✓	

Plax has the know-how to simplify the task of applying plastics to your product—as improvements, not substitutes—whether for civilian or military use. On defense work, we offer a background of extensive experience, gained by supplying on more than 5,000 prime contracts in World War II.

We offer, too, the advanced outlook of constant research and development. Our blow-molding techniques have widened the use of one-piece bottles and similar industrial shapes.

Our oriented Polyflex sheet provides the outstanding electrical properties of polystyrene plus high strength and improved fabricating characteristics.

if it's Thermoplastic— see PLAX first

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NATIONAL PLASTICS
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PHILADELPHIA
MARCH 11-14
SPI BOOTH 425

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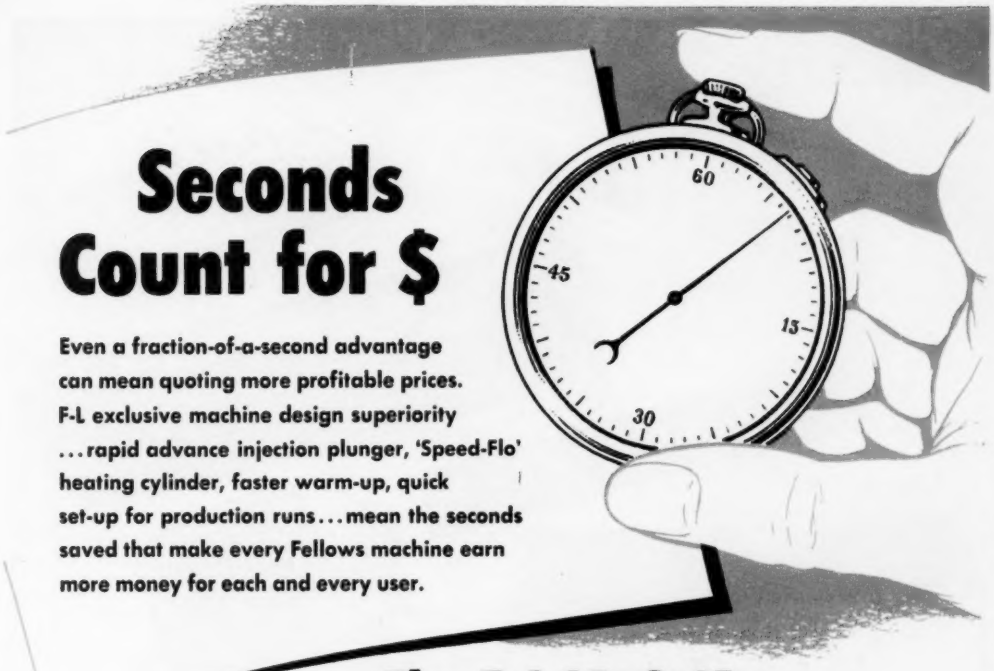
NOT SUBSTITUTES IMPROVEMENTS



Seconds Count for $

Even a fraction-of-a-second advantage can mean quoting more profitable prices. F-L exclusive machine design superiority ...rapid advance injection plunger, 'Speed-Flo' heating cylinder, faster warm-up, quick set-up for production runs...mean the seconds saved that make every Fellows machine earn more money for each and every user.

The F-L 1B-3-15

Hottest 3-OUNCE MACHINE ON TODAY'S MARKET!

See it at
BOOTH 525
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March 11-14

Since its introduction 2 years ago, this Fellows machine has swept the market like wildfire. It's still setting production records with injection molders from Maine to California. On single-cavity molds, operating at 'Hot Molding' speed, production on the 1B-3-15 is comparable to multiple cavity molds without danger of wasting critical plastic materials.

Today, the Fellows 1B-3-15, tried and proved in use, is far ahead in cycling speed, automatic operation, and overall machine economy. If seconds will pay off in your molding operations, investigate the details now. Call your nearest Fellows office.

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injection molding equipment

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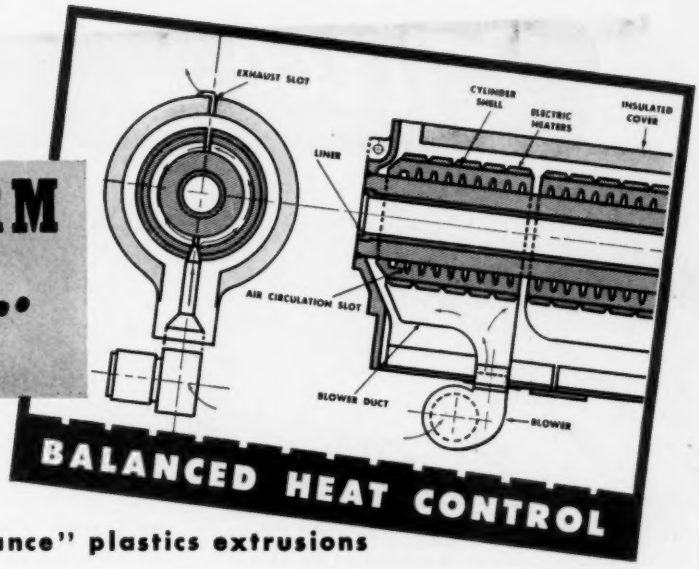

for "close tolerance" plastics extrusions

Here's another reason why NRM extruders are tops for plastics extrusion — "Balanced Heat Control" — another exclusive feature that gives you exact extrusions at no extra cost and no extra effort.

In all electrically heated NRM extruders, "Balanced Heat Control" provides absolute control over frictional heat; keeps the operating heat and the extruder temperature in complete balance; and, eliminates the principal cause of "pulsation" — compound heat in excess of its plasticizing temperature.

"Balanced Heat Control" is unique, simple, self-contained, highly efficient, and most economical. Basically, the system consists of a series of deep, narrow, circular slots, cut into the cylinder shell, through which high volumes of air are passed at low pressure. These inverted fin-shaped slots do not interfere with the conduction of heat from the band heaters during heating, yet provide the maximum area for the radiation of heat during cooling. The high volume of air, introduced at room temperature through small blowers, cools the cylinder wall quickly and evenly, permitting the rapid dissipation of heat from the compound. "Balanced Heat Control" also promotes sufficient cooling for shut down and does not require an expensive air compressor or any connections to air, steam, water or other pipe lines.

Of course, "Balanced Heat Control" is but one of the many outstanding features of NRM extruders — features designed, through long experience, to give you better products at lower costs. Write to the extrusion experts at NRM, today, and learn more about the best equipment for the best extrusions.

You're cordially invited, too, to visit our exhibit at the 5th National Plastics Exposition, Philadelphia, March 11-14, 1952. Booth No. 456. We'll be happy to see you and we'll do our best to make your visit worthwhile.

2906

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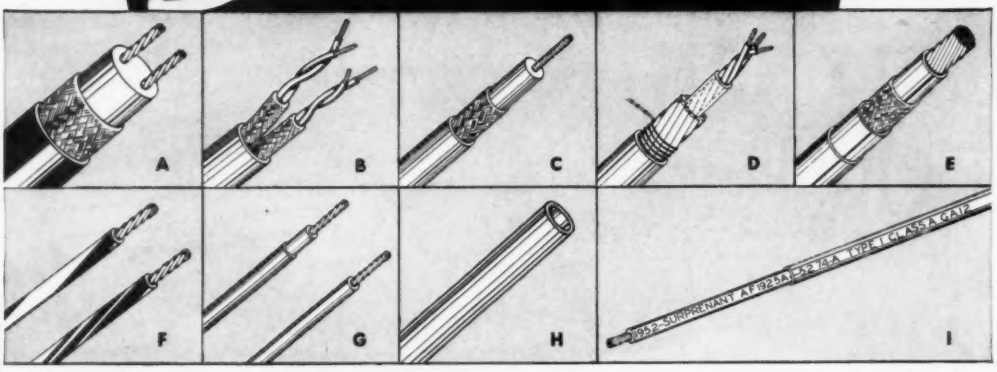
Surco WIRE · CABLES · TUBING

OPERATING TEMPERATURES FROM -60°C TO 200° C SIZES FROM 32 TO 4/0



A **Coaxial Cables**—"Surco" coaxial cables include a wide variety of types, such as low capacity, extra flexibility, small diameter, microphone 2 conductor, and high temperature "Surflon". Conform to Military Spec. Jan-C-17A. Many special designs. If you have a coaxial cable problem consult us.

B **Miniature Wire & Cable**—"Surco" miniature wire and cables are made in conductor sizes down to No. 32 AWG in stranded and solid. Close control in manufacturing permits small finished diameters on both single and multi-conductor cable. Available in standard colors with and without nylon jacket or shielding in the various vinyl or polyethylene compounds.

C **"Surflon" (200°C) Hook-up Wire**—Capable of operation at 200°C for long periods with no appreciable decomposition. "Surflon" (tetrafluoroethylene) is non-inflammable and resistant to chemicals (has no known solvent). Adaptable for high frequency use because of low electrical losses, "Surflon" also has very high volume and surface resistivity. It is available in hook-up wire sizes with shield or jacket.

D **Multi-Conductor Cables**—"Surprenant" multi-conductor cables are available with conductor sizes from No. 32 AWG and larger, with or without nylon jacket or shielding and can be made to specification for special design and applications. Close tolerances permit unusually small overall diameters and "Spiralon" color coding permits easy identification even when hundreds of conductors are involved.

E **New Improved Aircraft Wire**—"Surprenant" sandwich construction (vinyl-glass braid-vinyl-nylon) gives excellent overload safety, high and low temperature performance and good electrical properties (made to conform to Military Spec. MIL-W-5086). Nylon jacketed, it has greater resistance to abrasion, fungus, moisture, hydraulic and other oils. "Surprenant" also offers nylon jacketed-polyvinyl-chloride construction made to conform to Military Spec. AN-J-C-48A.

F **"Spiralon"**—"Surco-Spiralon" color coding is available on all vinyl and polyethylene insulated wires, with or without nylon jackets. One, two, or three color stripes are available in the standard Nema colors providing almost unlimited color identifications.

Solid color insulation is also available in the 10 standard Nema colors.

G **"Surco" A-10 For (105°C) Hook-up Wire**—A-10 is an unusually high grade vinyl insulating compound developed in our own laboratories for a better hook-up wire. It has excellent resistance to deformation, soldering, high temperature, low temperature and aging; high electrical properties; Underwriters Lab. approved for continuous operation to 105°C without fibrous covering.

JAN-C-76 Hook-up Wire—Made to conform to Military Spec. (WL-SRIR-SRHV-SRRF) in all sizes. WL available with nylon jacket or glass braid. The nylon jacket has greater abrasion resistance and high surface resistivity under adverse conditions. SRIR-SRHV-SRRF available with primary insulation only or with the addition of a glass braided covering. All standard colors including "Spiralon" spiral striping.

H **"Surco" Tubing**—"Surco" vinyl tubing is available in special formulations to provide low temperature (-65°C), high temperature (U.L. approved for 105°C), high dielectric strength, flexibility and colors. Standard compounds are carried in stock in regular sizes. Polyethylene and nylon tubing are also available and are carried in stock in natural color, limited sizes. S-18-A conforms to 12047-A.

I **MIL-W-5274A Radar & Electronic Hook-up Wire**—Made to conform to Air Forces Spec., this wire offers excellent low temperature performance. Nylon jacketed, it has high abrasion resistance and superior surface resistivity even under adverse humidity conditions, making it very adaptable for high impedance circuits.

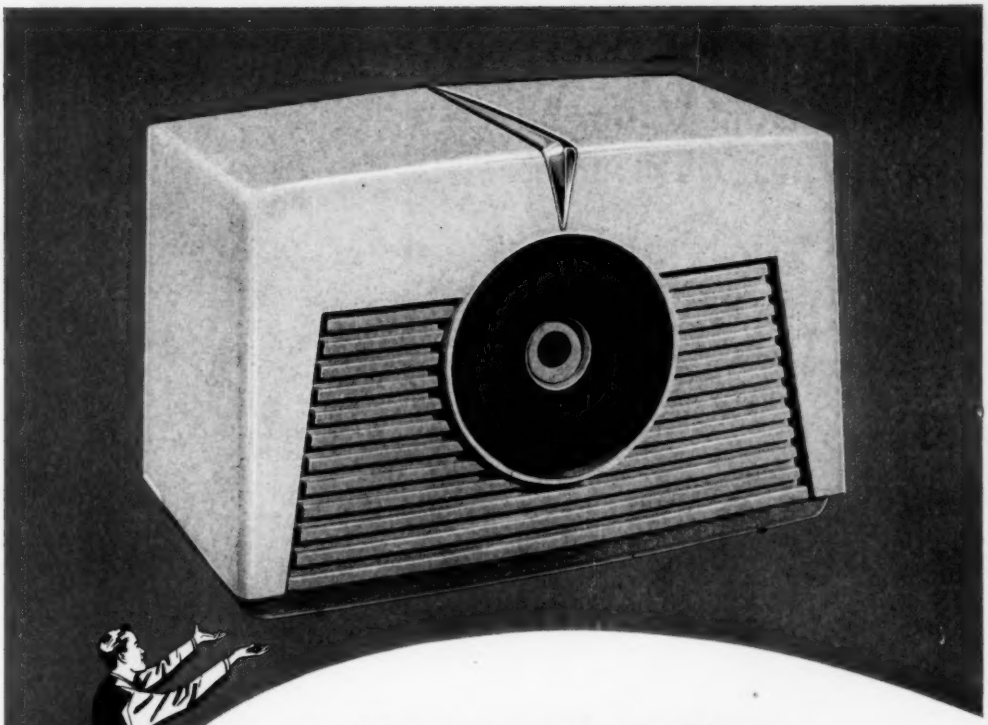
Surflene INSULATED HOOK-UP WIRE

"Surflene" Insulated Hook-up Wire—"Surflene" is extruded trifluorochlorethylene and is noted for its outstanding resistance to heat, abrasion, most chemicals, and fuming nitric acid. It has high dielectric strength and insulation resistance. It is especially adapted for small size hook-up wire for high temperature operation and for totally enclosed application. "Surflene" is available in thirteen solid colors to insure positive circuit identification. "Spiralon" colors not available as yet. Colors available at present are as follows: Red, orange, yellow, light green, dark green, blue, pink, gray, tan, black, brown, white, and clear.

Surprenant MANUFACTURING COMPANY

See you at the 5th National Plastics Exposition March 11—14, Booth 303

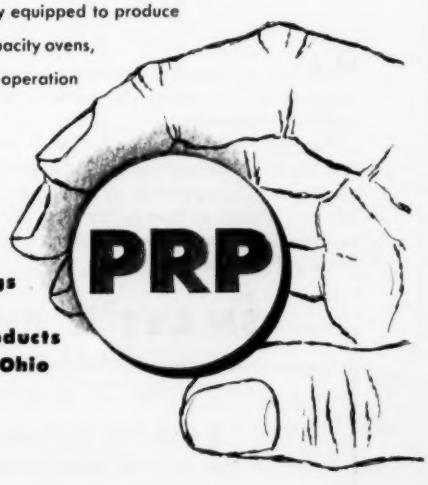
199 WASHINGTON STREET, BOSTON 8, MASS.



looking for someone to place painted phenolic parts in your hands?

Plastic Research Products' services include much more than mass production facilities for precision molding. With a job such as this painted phenolic RCA radio cabinet, for example, P R P does a *complete* job. We are one of a very few firms in the industry equipped to produce the piece, paint it, and bake it in our own big-capacity ovens, thus reducing handling, breakage and extra-operation shipments. Our own fleet of trucks and planes delivers the finished work right into your hands.

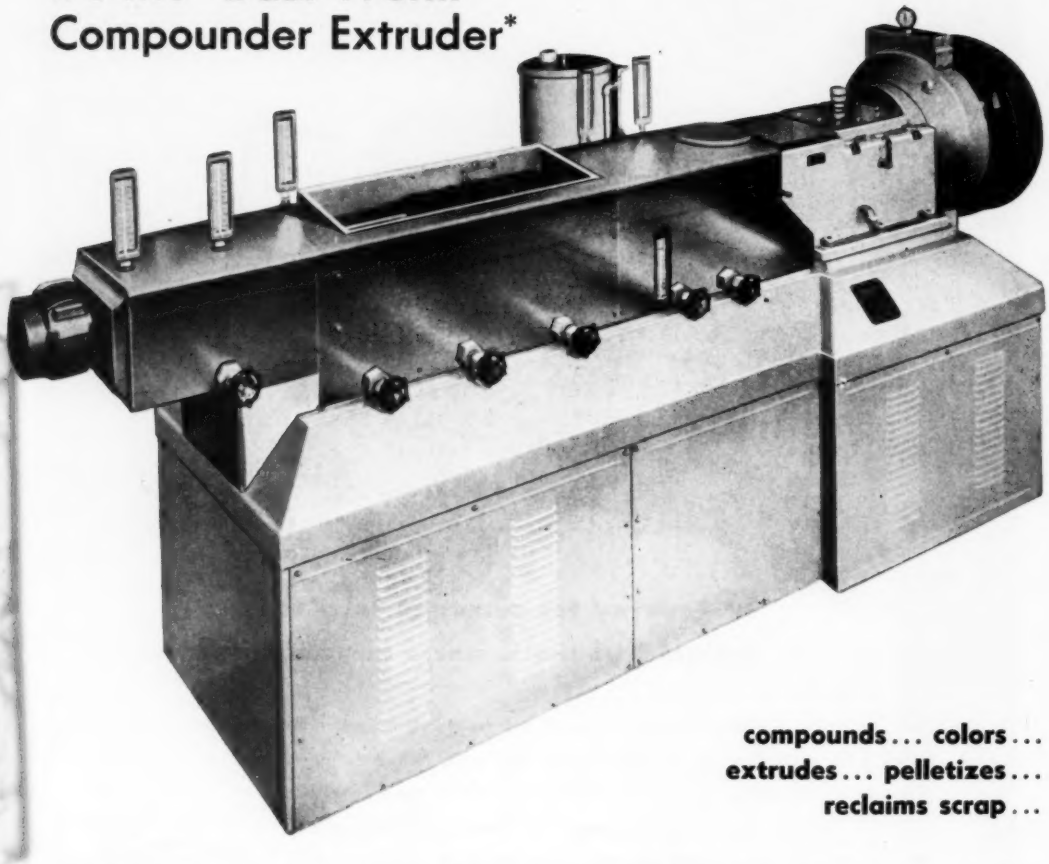
If you are interested in these *extra* services, write, wire or telephone us for information.



when you look for plastic moldings look first to Plastic Research Products Urbana, Ohio

DO 5 JOBS ON THIS 1 MACHINE!

It's the "Dual Worm" Compounder Extruder*



compounds... colors...
extrudes... pelletizes...
reclaims scrap...

HERE is an extruding machine to slash your production costs by doing the work of five separate kinds of equipment.

The patented interacting "Dual Worms" that operate in a "pressurized" cylinder provide the explanation. They generate so much power, work so fast and knead so thoroughly that they're able to perform functions beyond the capacity of most conventional extruders.

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The "Dual Worm" Compounder Extruder is available with 2" worms—output approximately 100 pounds per hour. Larger, higher capacity units are in prospect.

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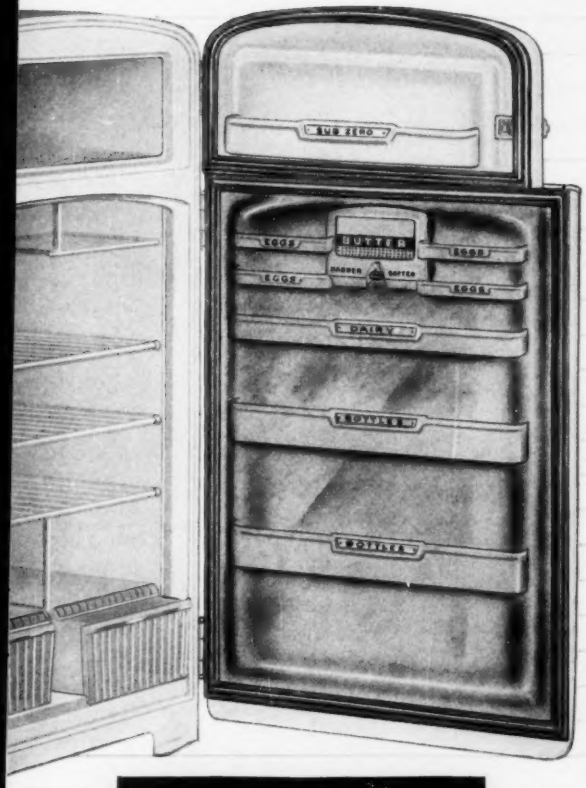
for the First time in plastics history Amos MOLDED PLASTICS... *and* Admiral *team up* TO PRODUCE THE FIRST ONE-PIECE REFRIGERATOR INNER LINER



1 mold replaces 3 . . . trays, butter warmer and the liner itself. Stronger, lighter weight, less assembly expense.

Amos giant equipment really flexed its muscles in molding this—*never before in plastics history*—43 7/16" x 28" one-piece, volume-production, Refrigerator Door Inner Liner for Admiral.

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AMOS BOOTH 215-B

National Plastics Exposition
Philadelphia, March 11-14

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OFFICES: NEW YORK, CHICAGO, DETROIT, PHILADELPHIA, NASHUA, N. H.

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THESE DAYS JUST ABOUT EVERYBODY * WELDS VINYL PLASTICS ON

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Send us your samples or a description of your products. THERMATRON engineers will provide detailed recommendations to improve your production and cut costs with specific THERMATRON equipment . . . You'll get a fast, constructive reply without obligation.

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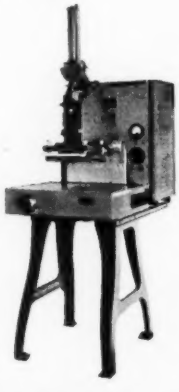

Standard Thermatron models from ¼ KW to 6 KW weld vinyl from .002" to .080", serving most requirements—or we can build to special application. Equipment also available for sealing cellulose acetate, and for electronic gluing of furniture and other wood products.

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ORIGINATORS OF DRY PROCESS PLASTICS EXTRUSION

Price Comb-out?

—WRITE TO B.I.P. FOR BETTER, CHEAPER MOLDS

B.I.P. Tools Ltd. are Britain's best mold-makers. Five days away from you by boat, a few hours by air. We make not merely the best, but around the cheapest molds that can be bought in America today (even *after* allowing for both freight and duty charges). Our standards? No finer-toothed anywhere.

Overall external dimensions of combs may be relatively unimportant, but no customer would accept a tool unless mating of the two halves were perfect. On comb tools, therefore, we work to fine limits on tooth forms, widths and pitches. Even relatively unimportant contours still have to be accurately mated. No fins or flash, no ejector marks are permissible.

We have made many comb molds and regard them as straightforward production jobs. On this one we incorporate six guide pins to ensure continuous true alignment. The robust design insures against any tendency to distort under pressure; flat surfaces keep flat, resist any tendency to flash. High polish facilitates easy extraction by automatic ejection of the runners.

The product: a 5 in. comb from this 10-impression injection mold.

TYBURN ROAD, ERDINGTON, BIRMINGHAM 24, ENGLAND. CABLES: PLASMOULD BIRMINGHAM

ZENITH PLASTICS CO.

Custom Molders of the Charles Eames
Prize Winning Armchair announce

added facilities available

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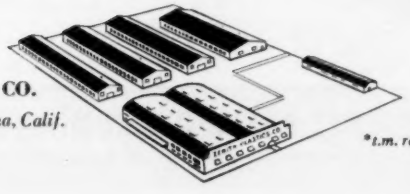
Fiberglas plastic moldings,
The Zenith Plastics Company has
expanded its preform and molding
department for both civilian and
military products. We can now offer
the following services in the development
and production of your product:

- Engineering & Product Design
- Prototype Construction
- Pilot Plant Production
- Large Volume Production

Informative brochure will be mailed
when requested on company letterhead.



ZENITH PLASTICS CO.

Custom Molders of Fiberglas Reinforced Plastics, Gardena, Calif.*

**t.m. reg.*

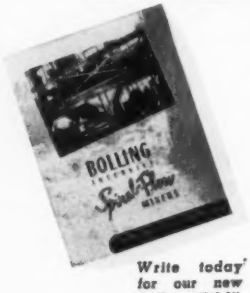
PUT IT TO WORK WITH THE PROPER MILL . . .

A BOLLING SPIRAL-FLOW INTENSIVE MIXER

THIS "TEAM" CAN DOUBLE, TRIPLE, PERHAPS EVEN QUADRUPLE YOUR PRODUCTION—*AT A LOWER COST.*

No. 4 Bolling Spiral-Flow Intensive Mixer for batch of approximately 150 pounds of 1.5 gravity, with 125 h. p. gear head motor on one-piece base.

Bolling mills are available in suitable sizes for the efficient, economical sheeting of plastics or rubber.



Write today for our new Bulletin "M-3".

Yes, sir, we mean just that! Bolling Spiral-Flow Intensive Mixers have been known to jump production 300% and cut mixing costs 70%. Bolling's 30-year background is ready to show you how you possibly can do likewise. These distinctive Bolling features will help:

1. Spiral-Flow steel sides which turbulate water or steam for hastening maximum heat transfer.

2. Split end frames for rigidity and quick accessibility.

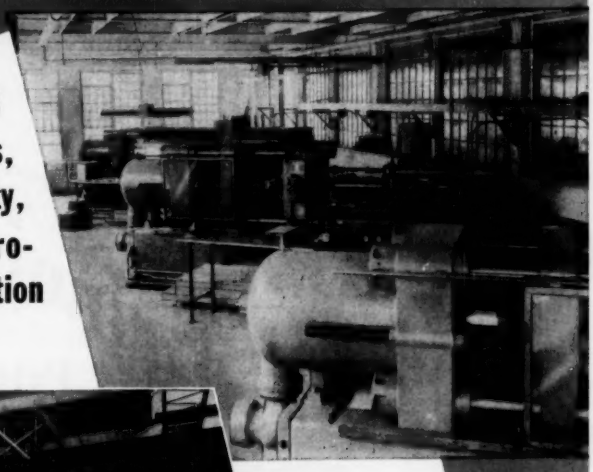
3. Anti-friction bearings maintain true centers, reduce power maintenance and practically eliminate end play in rotors.

STEWART BOLLING & COMPANY, INC.
3196 EAST 65TH STREET • CLEVELAND 27, OHIO

• INTENSIVE MIXERS AND MILLS • CALENDERS • REFINERS • CRACKERS HYDRAULIC PRESSES • PUMP UNITS BALE SLITTERS • SPEED REDUCERS

BIG ORDERS...LITTLE ORDERS
BIG PIECES...LITTLE PIECES

Erie has 23 injection molding presses, from 2 oz. to 80 oz. capacity, to provide efficient production for every injection molding job.



Above: Three large presses capable of molding the largest pieces required by manufacturers.

Left: Section of Molding Room showing 12 ounce, 28 ounce, and 32 ounce machines.

One of a series of advertisements describing Erie Resistor's complete facilities for quality custom injection molded plastics.

Erie's newly enlarged battery of 23 injection molding presses mean more than *quantity* production. They make possible an elasticity in production planning that turns out your requirements with the greatest possible *efficiency* and economy.

A short run of a small piece may be produced most economically on a two-ounce press. A large order for the same piece may be produced more economically with a multiple die on a larger press. And our largest presses, capable of molding 80 ounces of polystyrene in a single injection, are used not only to mold the largest single pieces required; they make it possible to speed production of smaller pieces by molding several at a "shot."

Combined with unexcelled facilities is a practical know-how that has been gained through years of experience by the pioneer in custom injection molding.

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND . . . TORONTO, CANADA

Erinoid POLYSTYRENE

From the machines of one of the world's most modern plants Erinoid polystyrene goes out in sealed bags to the injection moulders, to widen and enrich the range of British plastics.

The physical properties of polystyrene—low specific gravity, inertness to humidity, resistance to temperature changes, very low electrical loss factor, high break-down voltage—make it the ideal moulding powder for a wide range of products, just a few of which are illustrated here.

Erinoid polystyrene excels in its full range of opaque, transparent and pearlescent colours.

Available in the form of moulding powder, sheet and rod

STYRENE PRODUCTS LIMITED

96 PICCADILLY · LONDON · W1 · ENGLAND
Marketing Agents:
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FIBRON® EXTRUDED PLASTICS

Flexible Tubing

Fibron Tubing is produced in a variety of formulations to meet the requirements of specific applications. Inside diameters range from .015" to 3¼". Depending on formulation, tubing is available clear or in standard colors. Representative applications include:

ELECTRICAL INSULATION	Formulations for general-purpose service and for special applications involving high or low temperatures, corrosive atmospheres, or VHF use. Cut and coded to specification for wire marker use.
INDUSTRIAL TUBING	Types for piping a wide variety of liquids and gases, such as oils, gasoline and other petroleum products, acids (including HF and HCl), alkalies and halogens.
BEVERAGE PIPING	Non-toxic, non-contaminating formulations for conveying beer and other beverages for human consumption. For use in automatic vending machines, or other similar equipment.
MEDICAL APPLICATIONS	Non-toxic tubing for intravenous kits. Large-diameter tubing for fabrication of medical equipment. X-ray opaque tubing and monofilament extrusions also available.

Other Forms

Fibron Plastics are also extruded in many other forms to meet a wide range of requirements. Some of the most common forms are listed below.

SHAPES AND PROFILES	For use in gasketing, aluminum window glazing, dust seals, weather stripping and many other applications. Channels and other shapes produced to specification.
TAPES	For use as electrical insulation, and for wrapping metal parts and piping in marine and chemical installations to provide protection against corrosion.
RODDING AND MONOFILAMENT	Extensively used as splining, tying cord, and for low-power pulley drives. Produced in a wide range of diameters and in a number of formulations for specific uses.
FILM AND SHEETING	Ivithene (polyethylene) for use as drum and bag liners and for packaging of foods, chemicals, cosmetics and many other products. Available in extra-heavy thicknesses where required.
RIGID VINYLS	In representative shapes for use in a variety of applications calling for a rigid plastic.

GOVERNMENT SPECIFICATIONS

Fibron Transflex and Hyflex tubing conform to JAN-I-631 under Type F, Grade a; Fibron Polyethylene tubing to the same specification under Type A Many other types meet Air Force and Army Ordnance specifications.

SPECIAL REQUIREMENTS

Irvington Varnish & Insulator Company has complete facilities for research development and pilot plant production of special plastic formulations and colors to meet specific requirements for electrical, mechanical or chemical service.

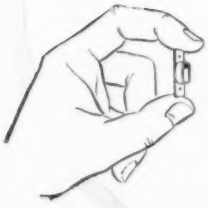
For technical data and engineering assistance, write us about your requirements in plastic forms and formulations.

Irvington
VARNISH & INSULATOR COMPANY

TRY US FOR SIZE

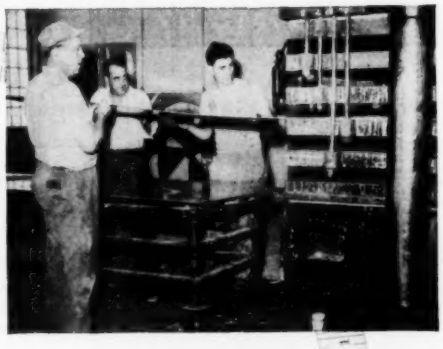
....from 1/4 Inch to 9 Feet

There are practically no limitations as to size, difficult shapes or depth of draw. *Repco* low pressure laminates, the most versatile of plastics, though only two thirds the weight of aluminum, have the strengths of steel and are of low moisture absorption and high temperature resistance.



From MATCHED DIE MOLDED PARTS

We operate the largest battery of presses. For the all-important aviation industry alone where quality, volume and adherence to schedules is so essential, we produce housings, electrical boxes and covers, fin tips, gap bands, ducts, fair leads, gun plugs and hundreds of precision parts.



To LOW PRESSURE LAMINATED SHEETS

Our giant 700 ton press produces reinforced laminates of Fiberglas, nylon and similar materials in sheets as large as 4 x 9 feet... as many as 15 at a time... in any thickness up to ½"... in an unlimited range of colors. *Repco Panels* are used for aircraft backing board, fuel cell liners, electrical housings, structures and a wide variety of other functional as well as decorative uses.

Or EXPANDED PLASTICS

In addition, under duPont license, we manufacture STRUX (CCA) cellular cellulose acetate... a light weight, sealed cell material that is extruded continuously in rods, boards or special shapes.

Our unusually large staff of engineers and chemists is eager to help you solve your problems at all times. Consult them and request samples of REPCO and STRUX.

SEE US AT BOOTH 616

5th NATIONAL PLASTICS EXPOSITION PHILADELPHIA MARCH 11-14

Repco Plastics *by Russell* **REINFORCED PLASTICS CORP.**

WEST HOFFMAN AVENUE • LINDENHURST, L. I., N. Y.

Affiliated Companies	STRUX CORPORATION	*Lindenhurst, L. I., N. Y.*
	AIRCRAFT SPECIALTIES CO., INC.	*Hicksville, L. I., N. Y.*
	REGAL PLASTIC COMPANY	*Kansas City 6, Missouri*
West Coast Representative	ALLIED PRODUCTS ENGINEERING CO.	*Los Angeles 43, California*

You can make money with scrap plastics and snips of aluminum wire

ALL over the nation along residential sidewalks, you can watch small fry happily brandishing toy guns that look like the real thing.

You'd never think they were made of scrap plastic—molded scrap plastic with a coating of aluminum film .000005″ thick. Actually they look more metallic than solid metal itself and they are within pocketbook-range of millions.

To make this possible, high vacuum is created and put to work in DPi metallization equipment. Vaporized aluminum condenses on the lacquer-dipped moldings because there is no air to interfere. It takes only 25 snips of aluminum, less than ¾ ounce, to coat 216 pistols at a time in the DPi high vacuum coating chamber. At this rate, you turn out a tremendous volume of profitable production before reaching the minimum reportable requirements for aluminum.

Possibly there is a place in your business where a practical, production-scale high vacuum metallizing process can save you money and markets. If so, the chances are DPi equipment can do for you what it has already done for toys.

We shall be glad to look into the details with you. Write for information to ***Distillation Products Industries,*** Vacuum Equipment Department, 779 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Metallized plastic pistols emerging from a DPi high vacuum coater.

Transferring pistols from the high vacuum holding fixture to a dipping tank for lacquer overcoating.

DPi

high vacuum research and engineering

Also . . . vitamins A and E . . . distilled monoglycerides . . . more than 3500 Eastman Organic Chemicals for science and industry

YOU CAN'T MISS!

. . . maximum plastic molding efficiency when you call on the complete facilities and knowledge of—

Bridgeport Moulded Products, Inc.

BOX 3276, BARNUM STATION BRIDGEPORT, CONN.

this box is "just the dish" for impressive product display

Boontonware sales are soaring. This "bounceable" dinnerware is easy to sell, easy to buy—largely because of effective, attractive, practical packaging. H & D display boxes in which Boontonware is packed set up in a matter of seconds on the dealer's counter, occupy a minimum of space, attract favorable attention to the product, invite inspection—and in displaying complete "sets," increase the unit of sale.

Whatever your product, an adaptation of this packaging idea may work for you. This package is only one of many types of boxes developed by the H & D Package Laboratory for products in every field — to help increase sales, reduce packaging costs, provide better product protection. For free booklet, "Pack To Attract," write Hinde & Dauch, 5208 Decatur Street, Sandusky, Ohio.

H&D

HINDE & DAUCH

Authority on Packaging

Low-cost BIPEL group drive cuts operating costs

The BIPEL system of driving a group of presses from a simple, medium pressure pumping unit depends on two novel BIPEL units: the unloading valve and the 2-ratio intensifier fitted to each BIPEL press. *

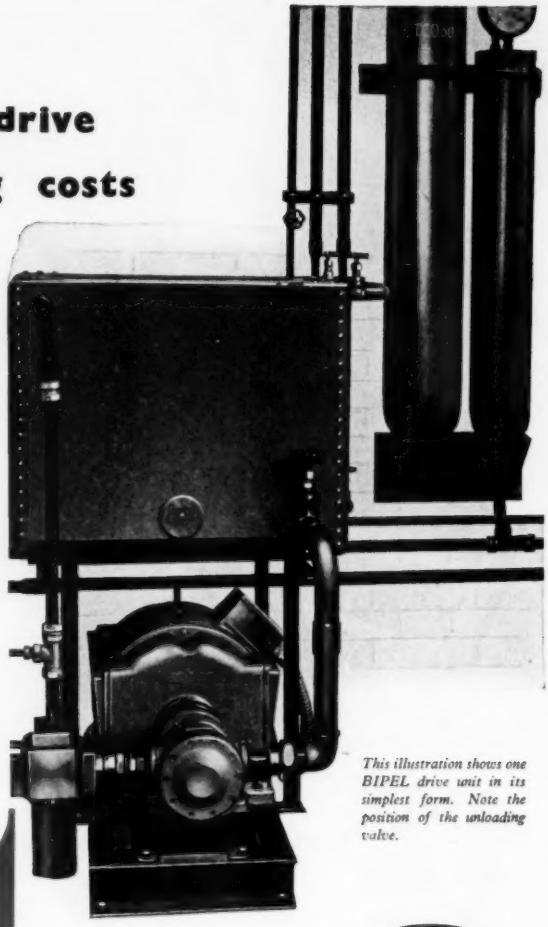
The drive unit (see diagram) consists of a rubber bag accumulator (the bag isolating the gas from the oil) with an extra gas bottle to increase the working capacity. The rest of the circuit consists of a vane pump, motor, unloading valve, tank and filters.

The pump pressure is reduced to zero when the circuit pressure rises to, say, 1050 p.s.i.— the fluid already pumped being locked in by a check valve. When the pressure drops to, say, 950 p.s.i., the pump is again put in circuit.

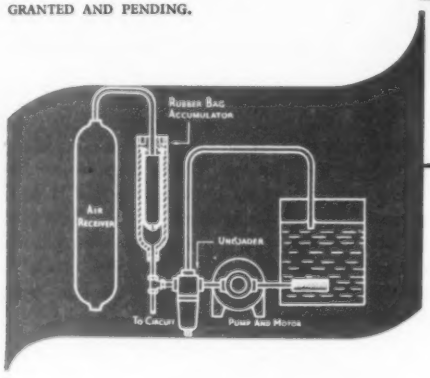
The unloading valve works on a novel principle, both unloading and loading pressures being adjustable during operation.

The valve cannot fail to relieve the pump, thus no extra safety valve is necessary.

*BRITISH AND FOREIGN PATENTS GRANTED AND PENDING.

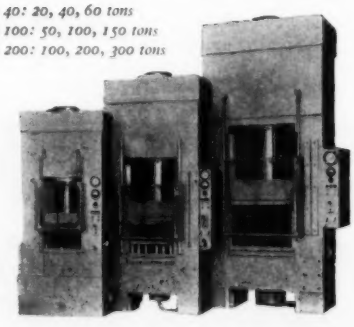


This illustration shows one BIPEL drive unit in its simplest form. Note the position of the unloading valve.



B·I·P GROUP

Type 40: 20, 40, 60 tons
Type 100: 50, 100, 150 tons
Type 200: 100, 200, 300 tons

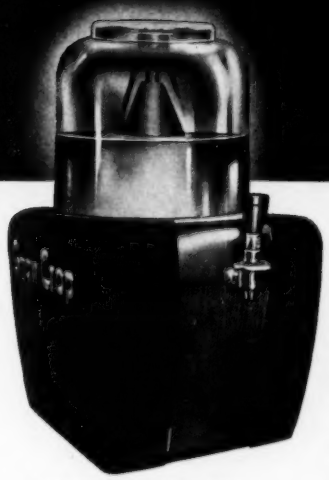


BIPEL presses are made in three models, each affording three molding pressures

B.I.P. ENGINEERING LTD., ALDRIDGE ROAD, STREETLY, STAFFS., ENGLAND

For Large Injection-Molded Parts . . .

PLEXIGLAS



Bowl and cap for Snow Crop dispenser, molded of clear PLEXIGLAS "V". Bowl is 10½" high, has base diameter of 12½", weighs 4.25 pounds. Injection molded on 200 oz. Watson-Stillman machine by A. L. Hyde Company, Grenloch, N. J., for Oiljak Manufacturing Company, Montclair, N. J.

. . . First, because PLEXIGLAS has the right *molding* properties for successful use in big injection presses. Note this large bowl for Snow Crop frozen juice dispensers. Thanks to the excellent flow characteristics of PLEXIGLAS, thousands of these bowls have been produced, molded to close tolerances at good production rates.

. . . Second, because the *physical* properties of PLEXIGLAS insure fine appearance and performance in a molded part. Here, the requirements of exceptional clarity, resistance to chemical action, dimensional stability, and strength to withstand sudden impact, were met by use of this Rohm & Haas acrylic plastic molding powder.

Clear and colored PLEXIGLAS is being used for more and more big moldings such as bowls, car visors, diffusers for lighting fixtures, and coin phonograph panels. If *you* want the best results in molding a large part, try PLEXIGLAS . . . for size.

PLEXIGLAS is a trade-mark, Reg. U. S. Pat. Off. and in principal foreign countries.

Canadian Distributor: *Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.*

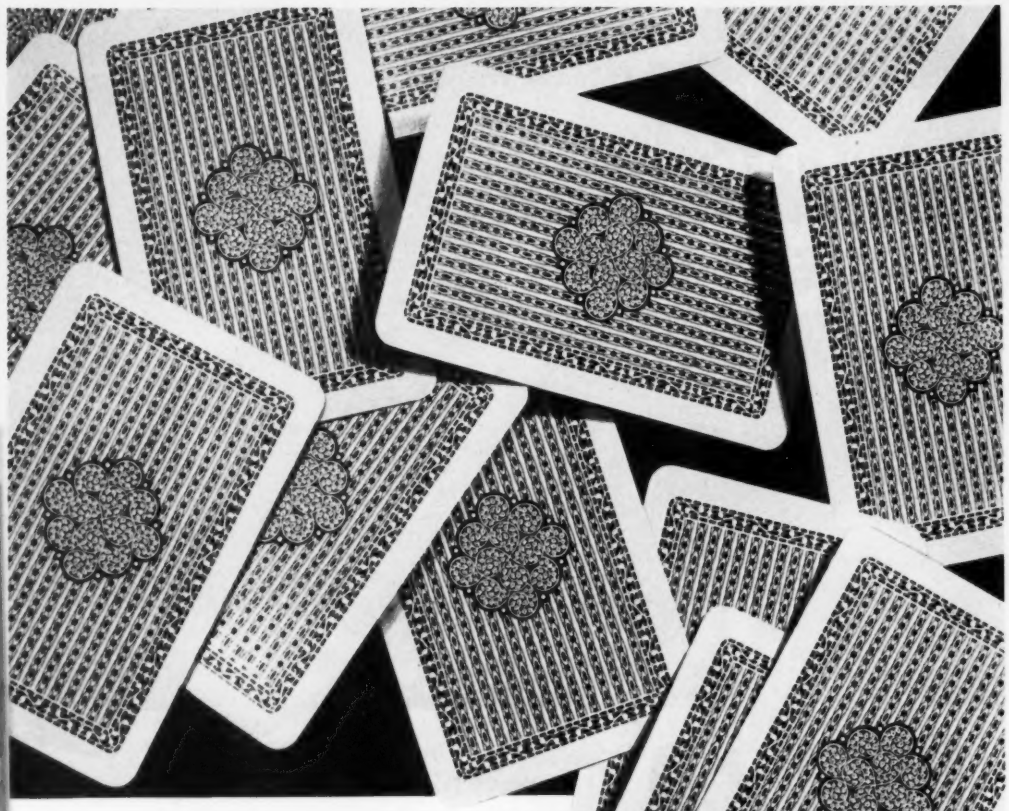
CHEMICALS FOR INDUSTRY

We'll be glad to send you our technical literature on PLEXIGLAS powders for injection and extrusion molding—and to discuss your specific application. Write us about your problem.

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

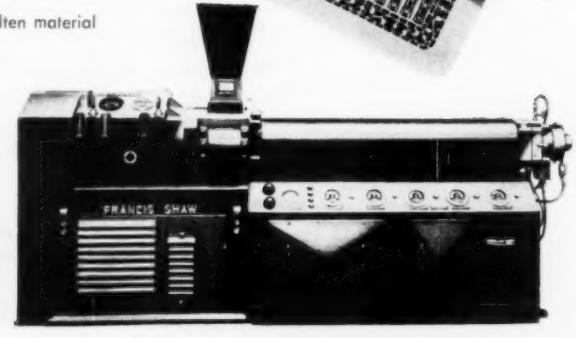
Representatives in principal foreign countries



uniformity

Shaw Plastic Extruders ensure uniformity in the continuous production of tubing, miscellaneous sections, insulating and sheathing of cables, film, colour mixing and the delivery of milled and molten material for sheeting and coating purposes.

PLASTIC EXTRUDER



SHAW

FRANCIS SHAW AND COMPANY LIMITED MANCHESTER 11, ENGLAND

Industry's headquarters for the best in plastic and rubber machinery.

Borrow These Brains

PUZZLING PROBLEMS

Designers, engineers and production people are constantly confronted with new and difficult fastening problems. Many of them are created by new products, new materials and new methods.

MADE-TO-ORDER SOLUTIONS

Continental's HOLTITE fasteners, both standard and special, are either specified or engineered for the application. This is why so many users of screw fasteners are now turning to Continental. They know "they can count on Continental" for fasteners engineered to their applications.

TWO HEADS BETTER THAN ONE

When it comes to finding new ways of fastening things together two heads are always better than one. Why not borrow our brains and let us go to work for you. If we can't find the right answer — there is no obligation. Continental Screw Company, New Bedford, Massachusetts.

You can count on

Continental

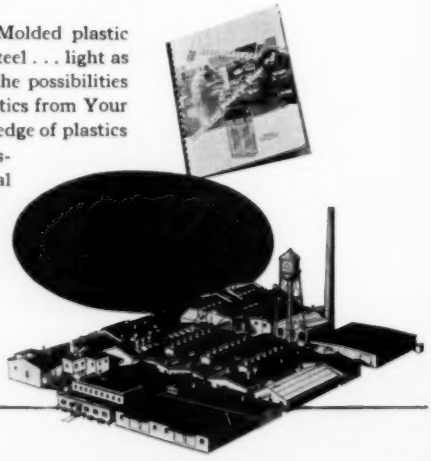
CONTINENTAL SCREW COMPANY INC. 1904

HOLTITE *Engineered* **FASTENINGS**

Copyright 1951, Continental Screw Co.

all tied up?

Do material shortages have your production tied in knots? Molded plastic parts offer a way out. There are plastic materials as strong as steel . . . light as aluminum; white as snow . . . black as coal. For *facts* about the possibilities and advantages of plastics, send for AICO's free booklet, "Plastics from Your Point of View." It is written—not to give you a technical knowledge of plastics—but for the layman's use in the practical applications of plastics. To see how plastics can loosen the bonds of your material shortages, send for your copy today.



AMERICAN INSULATOR CORPORATION
New Freedom, Pennsylvania

Aico's complete plastic molding service includes: Engineering Counsel; Mold Building; Injection, Compression and Cold Molding plus the molding of reinforced plastics.

A SPECIAL SERVICE TO MODERN PLASTICS READERS, REPORTING AND INTERPRETING THE LATEST NEWS AND DEVELOPMENTS FROM WASHINGTON AND ELSEWHERE AS THEY AFFECT THE PLASTICS INDUSTRY AND THE MOBILIZATION PROGRAM

Modern Plastics BULLETIN

March 15, 1952

Plastics Sales Volume

The sales situation in plastics materials has not shown any great change in actual volume since our January report. There was a big drop in December, but specific figures are not yet available. It is thought that polystyrene sales, for example, dropped from a little over 19 million lb. in November to about 15 million lb. in December. January sales show no improvement, according to people in the trade whom we have interviewed, and there has not yet been any appreciable change in February sales figures. Many molders have reported, however, that they expect to order before the month is over and are also planning substantial orders in March. It is assumed that molders' inventories have decreased to the point where they will have to order molding material in March if they have any business at all.

Vinyl resin sales for other than calendering uses have reportedly picked up in February following a slow January which was not a good month but still better than December. Except for the winter of 1950-'51, December and January have been traditionally low months in the vinyl industry as well as in nearly all other branches of the plastics industry, and it is assumed that, in a period of free supply, such as we have now, the same pattern has returned. There has been no improvement shown so far in film sales, according to reports, but that, too, may be an excess inventory situation. Plasticizer sales have been quite slow up to the present time and it will take them a month or two to pick up after resin sales begin to show more improvement.

Phenolic molding powder sales have declined somewhat from the substantial 16 million lb. of last November but are believed to have held more level since that time than most of the other plastics materials that are in free supply.

New Molds on the Way?

In general, over-all plastics sales are about in the volume range found in late 1949 and up to the start of the upsurge in the spring of 1950. Insofar as end products are concerned, the decline in sales has been almost completely across the board. But many new molds for large size products are reported to be in the toolrooms. There is still no indication that production of appliances using plastics parts is going to be resumed on a big scale again before the end of 1952, but military contracts may take up some of the slack by mid-summer or early fall.

Some of the encouraging signs in lines that affect plastics are that new dwelling starts in 1952 are expected to range between 800,000 and 850,000 units instead of the original estimates of 600,000; the number of automobiles to be allowed in the second quarter will be over 900,000 instead of the originally calculated figure of less than 800,000. From another angle, the business of working off inventories of items that use plastics is pointed up in the television industry where it is estimated that there are now only 1,500,000 units in inventory compared to 2,500,000 on July 1, 1951.

Benzene and Phenol

Benzene availability in the United States in 1951 reached about 260 million gal., counting the net 60 million which was imported and mostly refined in this country. About 25 million gal. were produced from petroleum and 175 million from coke ovens and tar distillation.

Benzene Availability

1939	30,500,000 gal.
1948	173,900,000 "
1949	134,800,000 "
1950	188,000,000 "
1951	260,000,000 "
1952 * †	280,000,000 "
1953 * †	320,000,000 "
1954 * †	355,000,000 "

* Estimated
† Imports of 40 million gal. net estimated for 1952; 15 to 20 million for 1953; none for 1954.

In 1952, production is expected to reach 280 million gal. divided as follows: from coke and tar distillers, 190 million; petroleum, 50 million; imported, 40 million gallons.

In 1953, production is expected to reach 320 million gal. divided as follows: from coke and tar distillers, 200 million; petroleum, 100 million; imported, 20 million gallons.

Benzene From Petroleum to Grow Rapidly

The increase from coke ovens comes from rebuilt and new coke ovens in the expanded steel program; benzene from petroleum is now running at about 40 million gal. a year, will be 60 million by mid-year, and 90 million by the year's end. Total capacity from petroleum could reach a 150 million gal. rate by late 1953. Thus, total domestic production of benzene in 1954 could be 355 million gallons. Phenol and styrene together would require over 200 million gal. of this benzol in that year if present projects go through as planned.

It is apparent from these estimates that several years will elapse before the U.S. becomes independent of the need for imported benzene, although the year 1954 is hopefully put forward as the goal when such an achievement may be attained. Present planned benzene production from petroleum may reach 150 million gal. that year; if it does not, imported benzene will still be necessary. It appears that about 200 million gal. of benzene from petroleum could be made available annually under present conditions by installation of recovery equipment, but such a quantity is not expected until after 1955. However, this type benzene sells in the 50 to 60¢ range; coke-derived benzene sells in the 30¢ range.

Synthetic Fuel and Chemicals

A synthetic liquid fuel plant is also a possibility within the next five or ten years. Such a plant with a capacity of 30,000 barrels per day of liquid fuel would also produce 34 million gal. of benzene; 35 million lb. of phenol; and 57 million lb. of cresol per year, as well as many other chemicals. Obviously, such a plant would take care of the need for this type of chemicals if the price is right. The distant future isn't as worrisome as thoughts of the exorbitant demand that might be caused by a global war in 1952 or 1953.

Large Increase Forecast for Phenol

Phenol production is planned to increase from 365 million lb. in 1951 to around 620 million lb. in 1954. From 21 to 23 million lb. each year will be natural phenol; the balance will be synthetic, made from benzol. The Government claims there will be a 20 million lb. deficit in 1953 even after expansion plans are taken into account.

In 1952, it is believed that about one-third of the phenol produced will be used for other things than plastics. This figure—140 to 150 million lb.—may not grow much through the expansion period. The principal items are lube oil additives and extractives, drugs (salicylates and aspirin), herbicides (weed killing), chemicals, detergents, and miscellaneous. The balance of the phenol is all intended for plastics. That's a big order and it looks good for plastics. Most encouraging sign was that requests for more phenol capacity were made largely by producers who use most of their own production themselves. They ought to know what they are doing. Shell molding is one spot where great quantities of phenolics are expected to go. Wood treatment, coatings, larger molded pieces, abrasives, and foam can account for increasingly large volumes.

Phenol Use in 1955

A very rough guess as to how phenol available in 1954 or 1955 might be distributed would be something like this: Products other than plastics, 155 million lb.; laminating resins after allowing for 30 million lb. of cresol per year may take 50 million lb. of phenol; adhesives for plywood, et cetera, 45 million lb.; molding powder, 150 million lb.; wood waste, 35 million lb.; shell molding, 85 million lb.; miscellaneous, including abrasives, brake lining, mineral wool binder, foam, and others, 75 million lb.; and protective coatings, 35 million lb.

In the shell molding classification, 85 million lb. is nowhere near the limit. In 10 years this one use is expected to take greater volume than the phenol used to make molding powder. In fact, many of the above classifications are expected to increase substantially between 1955 and 1960. Producers anticipate that the demand for phenol by 1960 may be one billion pounds.

Notes on Tables

Note carefully that, in the tables on next page, the total "benzene required" column includes an import figure of 60 million net gal. in 1951 and declining amounts thereafter. This total differs from government import figures since it requires about 1 million unrefined British gal. to make 700 thousand refined gal. in the U.S. for use in plastics or rubber. Most of this refined benzene is reported in the government statistics as produced by petroleum distillers and thus gets confused with regular production figures. It is expected that imports in 1952 and following years will be less than 1951 because Great Britain will be using more of its own production and thus will have less for export. By 1955, the U.S. may well be able to produce enough benzol to take care of its needs without imports.

The "miscellaneous" column in the tables gives arbitrary figures based on the amount of benzene that would be left after the needs for phenol, styrene, aniline, and nylon are deducted. In case of a pinch, benzene might well be diverted to some of these miscellaneous items and thus leave some of the major items short. Biggest in the miscellaneous group is detergents. This use consumed over 10 million gal. in 1950 and is still growing but the big upsurge is thought to be over. Weedicides may develop much larger volume. Maleic acid used 3 million gal. in 1950

and this volume will increase manyfold if polyester resins ever get into large production. Resorcinol is also included here, but the amount of benzene involved is less than 5 million lb. per year when all planned production comes in. Other miscellaneous

Products Produced From Benzene

	Phenol	Benzene Required	Styrene	Benzene Required
	Lb.	Gal.	Lb.	Gal.
1950	310,000,000	40,000,000	540,000,000	66,000,000
1951	365,000,000	48,000,000	700,000,000	86,000,000
1952	440,000,000	57,000,000	850,000,000	105,000,000
1953	500,000,000	65,000,000	1,000,000,000	122,000,000
1954	640,000,000	80,000,000	1,180,000,000	145,000,000

Other Uses for Benzene—Gal. Required

	Aniline	Nylon	Misc.	Total All Uses
1950	14,000,000	20,000,000	60,000,000	200,000,000
1951	16,000,000	20,000,000	80,000,000	250,000,000
1952	18,000,000	20,000,000	80,000,000	280,000,000
1953	18,000,000	20,000,000	90,000,000	315,000,000
1954	20,000,000	20,000,000	90,000,000	355,000,000

items have only minor relationship to plastics and none is likely to grow like plastics.

Nylon remains stationary at around 20 million gallons because other raw materials are now being used to supplement that portion derived from benzene.

Aniline is listed in the table because it is a major user of benzene. It is used primarily in dyes but has become important as a rubber chemical, especially for GR-S. However, even when expanded facilities for aniline are finished in 1954, total consumption of benzene for this purpose is not expected to greatly exceed 20 million gallons.

The future for styrene monomer production was discussed in this department in January. Consumption of the huge volume anticipated in 1954 depends somewhat upon continuation of the planned annual 860,000-ton synthetic rubber program. However, producers are confident of an ever-increasing market for styrene in other-than-rubber products. They have their sights set on a 2 billion lb. goal by 1960.

Melamine-Urea Glue for Air Force

A recent bulletin issued by the Air Force makes note of their acceptance of melamine-urea glue of the 50–50 type in hardwood plywood under JANP-139 for use in overseas packing cases. Formerly only phenolic glue was specified, but very little was used for this application because of curing problems; these packing cases happen to be one of the uses for which phenolic glue is not best fitted.

The acceptance by the Air Force of melamine-urea glue for this purpose means that there will now be a good supply of a formerly scarce material and a good market will be available to the Southern hardwood-plywood industry where most of this type plywood is produced.

What's Going to Happen to NPA?

There is considerable talk in Washington about what sort of an organization NPA may become in the next year or so, if no global war breaks out. Insofar as the Chemical Div. is concerned—and it is this branch of NPA in which we are most interested—the duties now are nowhere near as pressing as they were six or eight months ago when nearly all chemicals were tight. Now, with but very few exceptions such as sulfur, thiokol, acrylonitrile, polyethylene, and resorcinol, most chemicals are in good supply. Principal jobs confronting the Chemical Div. today are to work with the military to see that they get what is needed, to chart the course for chemicals industry expansion so that the most needed materials would be available in event of war, and to see that steel and other equipment is provided for expansion programs. These new programs have all been based on the theory that additional chemicals would be needed in the event of an emergency and supposedly are to be built as quickly as possible. It will be at least the end of 1952 before all these programs are definitely established and on their way to completion.

Staff Loaned by Industry

Personnel changes in the Chemical Div. are now taking place every day. A great portion of the staff consists of men who have been loaned by industry and their companies need them back, especially in this period when sales are generally slow. NPA officials are hopeful that the chemical industry will continue to supply efficient help to man the various jobs that are essential to maintenance of at least a skeleton organization that can be expanded rapidly in case of emergency. It is thought that a trained reserve staff of chemical industry executives who have had anywhere from six months to a year's training in working with the government is highly essential.

Officials admit it is not fair to keep a man away from his company for more than a year, but they are also quite intent on building up a capable reserve that can be called on in war time so that the chemical industry can be efficiently served in its government relations by a staff of trained executives who know not only their own business but how to work with the government.

NPA Service Gives Background Experience

NPA officials point out that service in the Chemical Div. has often been claimed to be equal to a course in one of the nation's better business schools insofar as it relates to the chemical industry. These officials are pleading with industry to send them executives who have already proven their ability and are ticketed for promotion in their own companies.

It is quite noticeable that a number of Chemical Div. officials have already returned to their own companies to take over more responsible positions than those they had before coming to NPA. In other words, their companies have used the opportunity to send

promising executives to NPA where they can broaden their industrial knowledge and organizing ability through their government experience. It is hoped that industry will continue to send such men to NPA, not only to gain valuable training there, but to bring their knowledge of the chemical industry to NPA and to insure fair and adequate representation of industry in that organization.

It is reasonably certain that NPA will be with us for several years, regardless of what happens next November. The question is: Should it be managed by an inexpert staff of clerks or should it contain a sizeable sprinkling of men from industry who understand the tremendously intricate workings of the chemical industry?

Personnel Changes in Washington

George Sollenberger, who has been in charge of the Thermoplastics Section of the Plastics Unit of the Chemical Div., has accepted a position as assistant to the president of Tupper Corp. and has moved to Orlando, Fla., where the Tupper Corp. will set up operations in the Municipal Airport pending the construction of a new plant. It is anticipated that this location will eventually become headquarters for Tupper, but at present the Texas and New England plants will continue their current operations. Mr. Sollenberger was formerly with Rohm & Haas Co. and worked in various capacities in the Plastics Unit of WPB during World War II.

Willard D. Crater, Jr., of the Naugatuck Chemical Co., Div. of U. S. Rubber Co., has replaced Mr. Sollenberger. Joe Rodgers of Bakelite Co. replaced T. S. Martin of Monsanto as head of the Thermosetting Unit last January 1.

Bernard Langton, well known to the plastics industry because of his responsibility in handling styrene monomer, phenol, and phthalic anhydride for NPA during the past 10 months, has returned to Monsanto and will become chief of their Cleveland office.

Dr. Warren Stubblebine, who directed plastics activities in the Research and Development Section of the Quartermaster General's Office, has resigned from his position there to go to The Connecticut Hard Rubber Co., New Haven, Conn. He has been succeeded as acting chief by John Couture, who has been with the Quartermaster Corps for several years and has specialized in fabric coatings, vinyl materials, and the like.

Polyethylene

Demand for polyethylene seems to have eased up a bit over the past two months—or perhaps customers have become so accustomed to doing without all they want that they no longer complain.

Available material was divided up for February in about the same proportion as January: military, essential civilian, and free distribution classifications each received about one-third of total production. Allowance for the shutdown of one plant in late February was made by taking some material out of stock; increased production will take care of that withdrawal in a month or two.

Not Much for New Customers

Demand is still so great, however, that new customers will not be able to get material in good quantity until June 1952, when total production is expected to reach about 150% of June 1951.

The military take has dropped from 46.4% of total production in June 1951 to around 33% in February 1952. But the total draw in poundage has not declined in the same volume because polyethylene production has been on the rise since October. Over half the military consumption is for assault wire. It is believed that military consumption may go up in the third quarter when money from the new budget becomes available.

Packaging Allocations

Allocations to packaging declined from 20% of the total in June 1950 to 8% in February, but the decline was largely brought about by switching several items from the essential civilian list to the free list. The only such applications now on allocation are those for bulk packaging of dried milk, chemicals, and pharmaceuticals. Rigid plastic frozen food container producers recently asked for allocation but changed their minds. It was pointed out that they have obtained from available free material an average of over 108% of their historical take since allocation started. In January 1952 they received 145% of their June consumption. Their claim for more was based on assumption that home freezers have increased from 6500 in 1946 to more than 4½ million in 1951. Original base period use was 175,000 lb. a month—from June 1951 to January 1952, average consumption for rigid containers was over 189,000 lb. a month. Much of this poundage was made possible because a large portion of the polyethylene produced was unsuitable for film, but satisfactory for molding purposes.

Non-packaging allocations have run from 15 to 27% of the total material available. Such uses were chiefly mine pipe, communication cable, power transmission cable, camelback, hospital surgical tubing, and water purification equipment.

Closures have been getting from 1 to 2% of polyethylene production for the last six months.

New Uses in Prospect

Some of the new uses now ready to go but still waiting for more polyethylene include electrical pressure sensitive tape; battery separators and tubing to replace natural rubber and other materials in industrial storage batteries; foil laminates for packaging photographic film; printing inks where low molecular weight polyethylene can be used to upgrade ink to improve its efficiency. In this latter use the polyethylene acts similarly to conventional waxes, but is better. So far, this application is mostly confined to inks used for printing packaging materials.

NEWS AND VIEWS OF PLASTICS PROGRESS

STOKES plastics review

VOL. 1
NO. 2
1952

PUBLISHED BY F. J. STOKES MACHINE COMPANY, PHILADELPHIA 20, PA.

Thinking of the Fishing Season?

Probably few are, except fishermen, and they'll hardly sleep nights until the season opens. Also there are the fishing tackle manufacturers such as Horrocks-Ibbotson of Utica, New York. It is to be presumed they think of little but fishing.

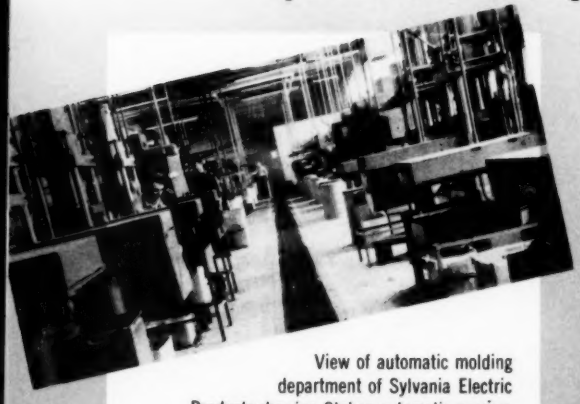
When they are not thinking about fishing they think about manufacturing costs. Saved a lot of money by switching to automatic molding of the side-plates for their unusually popular Sea-Level winding-reel . . . and increased production from 60 to 270 per hour . . . cut press labor cost by 90%.

On the Stokes fully automatic Model 741 Horrocks-Ibbotson reached a 2-minute molding cycle with a 9-cavity mold . . . minimum flash and hardly any de-burring. Also, they lengthened mold life and cut material waste from 10% to 4% of actual weight.

Good thinking!

Fishing-reel parts made by Horrocks-Ibbotson on Stokes fully automatic press.

Sylvania Cuts Molding Costs with Automatic Presses



View of automatic molding department of Sylvania Electric Products showing Stokes automatic presses

Sylvania Electric Products, Inc., Warren, Pa., molds a wide variety of parts automatically for electrical and electronics work. Parts are identical to the last detail, without the high costs of skilled labor or material waste. Instead, a battery of Stokes fully automatic presses does the job producing a maximum of finished parts with a minimum of labor. Operation of the presses consists only of filling the hoppers with molding powder and removing finished parts at regular intervals. The presses are completely self-contained, easy to install, and one man can handle a battery of a dozen or more.

Among the many parts manufactured by Sylvania on Stokes 741 and 200D-3 automatic presses and 252 closure presses are medium combination lamp-holders, butt-on starter sockets, miniature tube sockets, large television tube bases, and threaded parts.

Plating Cost for Plastic Costume Jewelry Cut 57% by Vacuum Metallizing

The new compact Model 425 Stokes Vacuum Metallizing unit for moderate production. Available at the Stokes Plastics Laboratory in Philadelphia for experimental and test work by interested manufacturers. This unit will be in operation at the Plastics Show.

One manufacturer reduced his plating cost for costume brooches from 7c each by silver reduction to 3c by vacuum metallizing.

Equally successful on plastics or metal, vacuum metallizing delivers fixed color standards of silver, copper, rhodium, and gold in all shades.

Brilliant finish is attained without hand buffing and other troublesome operations characteristic of older processes. Fast too . . . 500 to 4000 pieces every 20 minutes.

Vacuum metallizing is clean, simple, fast, and low in cost. It offers the plastics manufacturer an unlimited selection of permanent flawless plastic and metallic colors for the finishing of plastic products.

New High-speed Stokes Model 800 Handles all Thermosetting Plastics and Alkyds without Modification

This 15-ton fully automatic press was designed for production of all thermosetting plastics, including alkyds *without press modification*.

It makes a wide variety of simple or complex parts. Shuttle type feed and positive ejection are of the most advanced design, yet they have been proved in service in the popular Stokes 741 Model. The air-operated main cylinder acts through a toggle to give the ideal molding action: fast in closing, slow in pressing.

The press is exceptionally fast, permitting a full cycle of 5 seconds plus cure-time. Speed is reduced by a single adjustment.

Top and bottom knock-outs are cam-actuated and adjustable for stroke with a single screw. Ejection is entirely mechanical and fully positive.

The feeding mechanism accommodates any number of cavities within the dimensions of the mold and the capacity of the press. Modern shuttle-type feed places all powder accurately in the cavity, insuring clean operation and high material savings.

Molds for other Stokes 15-ton automatics are fully adaptable to the new Model 800, and even easier to change.

THREE NEW STOKES MACHINES IN OPERATION AT PLASTICS SHOW

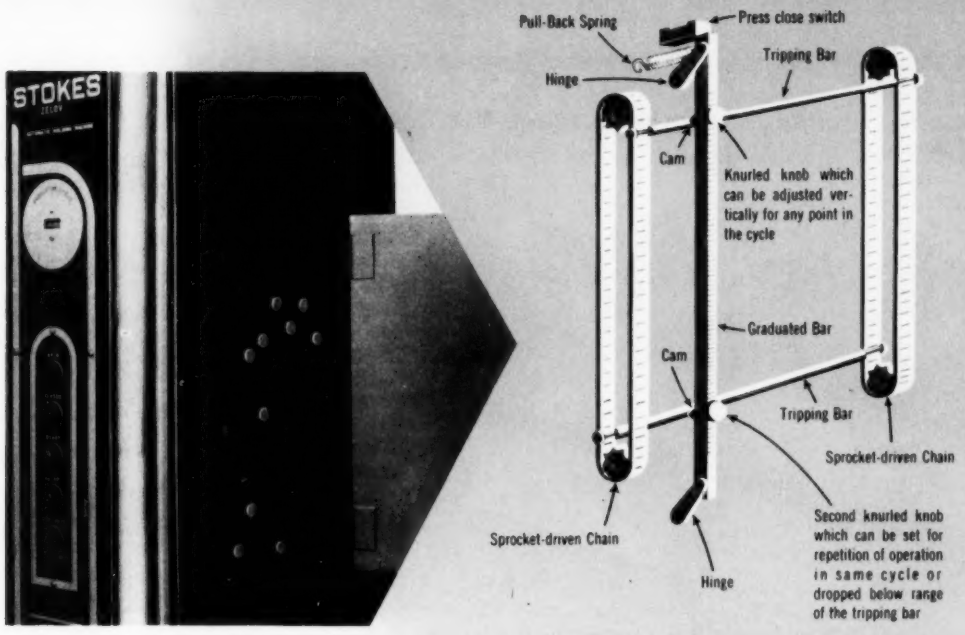
Three things new we can promise in the Stokes exhibit . . . all in operation!

One is the Stokes-Windsor RC-200 Extruder which extrudes, compounds, colors and pelletizes . . . makes sheets up to 54 inches wide and as thin as 3 mils (by inflation). The machine will be compounding and pelletizing PVC on a production basis for the first time ever at a Plastics Show. An RC-100 extruder will be in operation at the Stokes laboratory demonstrating rigid PVC extrusion.

Next is the new (first showing) Stokes Model 800 fully automatic press for molding all thermosetting compounds. This includes alkyds, which are handled without press modification. It is the fastest, most flexible press of its type now available. This press will also be on view in the Plaskon Trailer molding alkyd compound.

Third will be a Stokes Vacuum Metallizing unit which will be metallizing plastic pieces . . . another first time ever at the Plastics Show.

Stokes representatives look forward to seeing you at Booth No. 330, Plastics Show, Philadelphia, March 11 to 14.



Stokes Bar Controller which controls molding cycle on Stokes semi-automatic presses.

Molding Cycle Control of Semi-Automatic Presses

The Bar Controller (exclusively Stokes) automatically controls the sequence and duration of all steps in the molding cycle . . . opening, closing, de-gassing, curing . . . eliminates all timers but one and as many as five complex and temperamental relays.

The sketch shows a single bar for control, let us say, of the press closing. The upper knob is set to correspond to the point in the cycle at which the press should close. The crosswise tripping bar (upper in this sketch) descends on the sprocket-driven chains and strikes the cam on the back of the knob. This throws the hinged bar forward and trips a micro-switch which energizes a 4-way valve and closes the press.

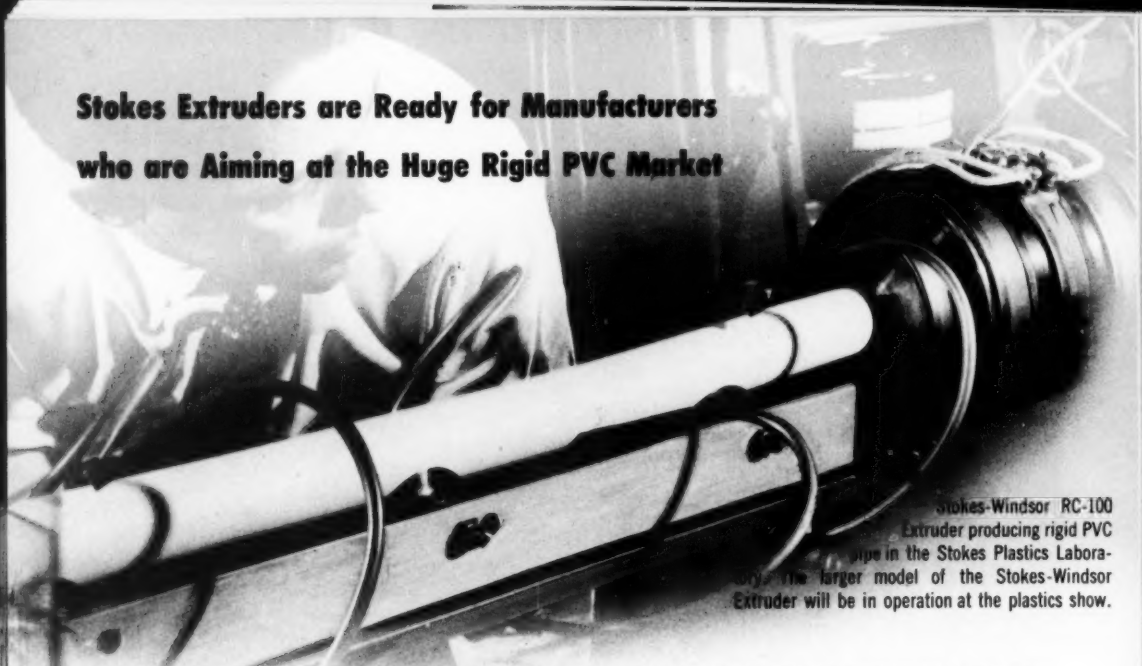
The bar control motor stops and the timer controls the press during the curing period. After curing is finished, the bar controller again takes charge of all other press actions including opening, closing, de-gassing, et cetera.

What is the Effect of Moisture on Plastic Preforming Powder?

Stokes brochure "Plastic Preforming" tells the answer to this and many other problems of preforming. Screen analysis, weight, size, shape, temperature and other factors are discussed in this comprehensive but compact brochure. Methods of preforming, punches and dies for the process, and a catalog section on Stokes Preforming presses are also included. Catalog No. 509 will be sent on request.

STOKES

Stokes Extruders are Ready for Manufacturers who are Aiming at the Huge Rigid PVC Market



Stokes-Windsor RC-100 Extruder producing rigid PVC pipe in the Stokes Plastics Laboratory. The larger model of the Stokes-Windsor Extruder will be in operation at the plastics show.

It is estimated by competent authorities that the market for rigid PVC will run to 100,000,000 pounds per year within the next decade. Plastics suppliers, as recently reported, are beginning to feel the tremendous demand for rigid PVC piping for a wide range of industrial use.

Rigid PVC pipe is replacing scarce and costly stainless steel and other pipe at remarkably low cost. Such pipe is highly resistant to corrosion and is easily installed. It can be heated by hot air gun at 200°F. and bent by hand. Valves and other fittings of the same material will soon be available.

Stokes is demonstrating at the Plastics Show the type of equipment to make rigid PVC pipe and other extruded products including sheets and a variety of shapes.

Good chance to see the first available model of the Stokes-Windsor RC-200 in operation at the Stokes Exhibit in the Plastics Show, Philadelphia, March 11 to 14.

Wade Electric Makes 40,000 Insulators per Press per Day on Stokes Automatics

At Wade Electric Products Company of Sturgis, Michigan, each Stokes 741 with a 30-cavity mold is doing the work of a 48-cavity plunger press with preform press and electronic preheater.

The saving in capital investment is substantial. Labor cost is reduced too, because one man runs the battery of 741 automatics, while the plunger press set-up takes one man per press plus additional help for preforming. Material savings as high as 10 to 15% are also an important economy of this automatic molding installation.

One of the Stokes 741 automatic molding presses used by Wade Electric Products Co. of Sturgis, Mich. Operator is required only to load molding powder and take away finished parts.

STOKES

F. J. STOKES MACHINE COMPANY

5934 TABOR ROAD, PHILADELPHIA 20, PA.

STOKES MAKES Plastics Molding Presses / Industrial Tabletting and Powder Metal Presses / Pharmaceutical Equipment / Vacuum Equipment / High Vacuum Pumps and Gages / Special Machinery

MODERN mp PLASTICS

New Heights Ahead for Plastics

WE believe that this is the first issue of any industrial magazine ever to be devoted entirely to the future.

It is most fitting that such a precedent-breaking issue be produced by a publisher serving the plastics industry and its industrial end users. The growth of plastics has been a continual shattering of tradition; the future of plastics will depend on the same approach.

This month marks a new high point in the history of plastics development and application. It marks a new plateau from which we must move on up to scale new heights of production, application, and distribution.

With at least a 10% over-all increase in plastics production promised in 1952, and with more output projected for later years, the opportunities for plastics to move into new markets are unlimited. With equipment now installed or in an advanced state of development, our scope of application in size, shape, and quantity should be unlimited. With recent improvements in resins and molding compounds, with new and better materials coming up, our scope of functional usefulness will be unlimited.

The only limitation on our ability to climb to new heights from the present plateau is the power of our collective imaginations. Without imagination we can grind ahead, adding volume to present applications; with imagination, we can open up new markets that will be bigger than any we now enjoy.

The purpose of the editorial material in the following pages is to stimulate imagination—and to incite aggressive action. Twelve leading industrial designers have contributed specific concepts of tasks still ahead for plastics. Their contributions begin on page 94. All are completely covered by copyright.

Several score production officials from among major companies now rated as big end users of plastics components have told what they hope to do with plastics in the future. That information will be found beginning on page 118.

Development men among material makers are represented in broad cross-section starting on page 128. They have given their opinions as to what new and further uses are indicated for their present resins, what improvements in their materials may be expected, and what trends in new material development may be worth more study.

Engineers in molding, extruding, fabricating, and processing plants have combined to contribute the lead feature in our Engineering Section, beginning on page 137, telling what they will need in equipment if they are to meet the demands of future markets for plastics.

Finally, Dr. Howard E. Fritz, vice president of The B. F. Goodrich Co. in charge of research, has written the lead article in our Technical Section, beginning on page 149, outlining his ideas about future sources for plastics materials, future broad fields of applications for plastics, and future trends in plastics technology.

The Editors owe their best thanks to at least 300 individuals who have contributed in some way to this issue. To the Society of the Plastics Industry, the Society of Industrial Designers, the Society of Plastics Engineers, and the Industrial Designers Institute, our sincere appreciation for their cooperation in the project.

Plastics Futures

The Cross-Country Commuter

By RAYMOND F. LOEWY

FOR many years it has seemed to me that some sort of special facilities should be offered to the steady, long-distance commuter who may prefer rail to air travel. This is that person who must make a Chicago-New York or Washington-New York trip once every week or month. Time and convenience concern him most. He would willingly sacrifice luxury and extra service for a dependable schedule of departures every other hour during peak traffic periods, for a train equally divided into reserved and non-reserved sections, for faster passage in simple comfort.

These benefits could be realized on today's track systems using the type of twin-car, duplex unit I have visualized. Designed to carry 44 passenger in roomette accommodations, with two observation sections, and airplane-type hot food service, this unit could probably cut four to five hours from the Chicago trip using existing track systems.

Allowing that trains now travel at their maximum speeds through the Eastern mountainous regions, where curves are sharp and grades severe, the light units, given undisputed right-of-way, would gain their time in two ways: by "subway-fast" acceleration and deceleration and by reduction of parasitic time lapses in any one station. In my opinion, and not necessarily that of any railroad companies with which my organization is associated, a 25 or 30% reduction in running time is not unreasonable. Generally speaking, plastic materials are indispensable to the economy and lightness of such conceptions as this. Although there is not yet any substitute for metal in body constructions of this sort, a great many components required to build such a unit can be—and may now be—a plastic of one sort or another.

When there is a clear plastic which is hard enough to resist abrasion, all glass can be replaced. Plastics (now in wide use in planes) will make it possible for many structural members to be eliminated which now support or brace glass installations, and freer forms can be molded to enclose these spaces.

In this present solution, the entire interior is intended to be plastic-treated or fabricated in plastic. Bulkheads, wall insulation, soundproofing materials, upholstery, light fixtures, food and beverage equipment, flooring materials—all of plastic—would be easily and quickly cleaned (a necessity which the condensed schedule would demand) and would be (when fully developed) inert and odorless.

From a safety viewpoint, plastic has many advantages over glass or metal. Unfortunately, one of these is not safety in case of fire, a development which, in my opinion, would be a major contribution of the plastics industry to designers seeking proper materials for transportation equipment.

RAYMOND F. LOEWY, head of Raymond Loewy Associates, began his career as a fashion illustrator. With his design for a nationally known automobile in 1929, he established himself as a pioneer in industrial design. Since then his world renowned work has ranged from packages to locomotives, from electric shavers to refrigerators, from machinery to department stores, from vending machines to office equipment, from radios to ocean liners.

Plastics Futures

Multiple Uses – Wider Markets

by GERALD C. JOHNSON

DESIGNING to sell to tomorrow's customers calls for new ideas. But one of the basic incongruities about new ideas is the fact that while both manufacturers and customers like them, they actually shy away from them at first. It's more comfortable and easier to stay in the groove, to keep on making and selling products that "everybody's askin' for" and is familiar with.

One of the healthy and challenging things about designing plastic products is the fact that you can't do a good design job on a new plastic item without departing from the norm. The materials, processes, and manufacturing techniques demand new ideas, new forms, and new colors. This means that we all have a selling job on our hands, and that ideas for tomorrow's customers have to be sold down the line to plastics manufacturers, their engineers, production people, and salesmen and, of course, jobbers, distributors, retail buyers and, equally important, the end-use customer.

As I see the market and the future, the majority of the new and large plastic products everyone is talking about and would like to have, will be based on new, better, and more economical replacements (not substitutes) of competitive materials such as metals, woods, glass, ceramics, rubber, paper, and fabrics.

Assuming that there is no great argument about where the markets are and the part plastic materials will play in the development of products for these markets, how do we go about getting the answers? It can't be done with airbrush dreams, a slide rule, or while sitting in the office or tool room. Someone has to go out and shake the bushes in each field and talk to engineers, executives, production men, salesmen, buyers, and customers about *their* business in *their* language, check competition, explore the economics and potential sales volume, and come back with ideas of "what to make" that can be translated into designs, tools, and products that will meet the customers' needs—and will sell at a profit.

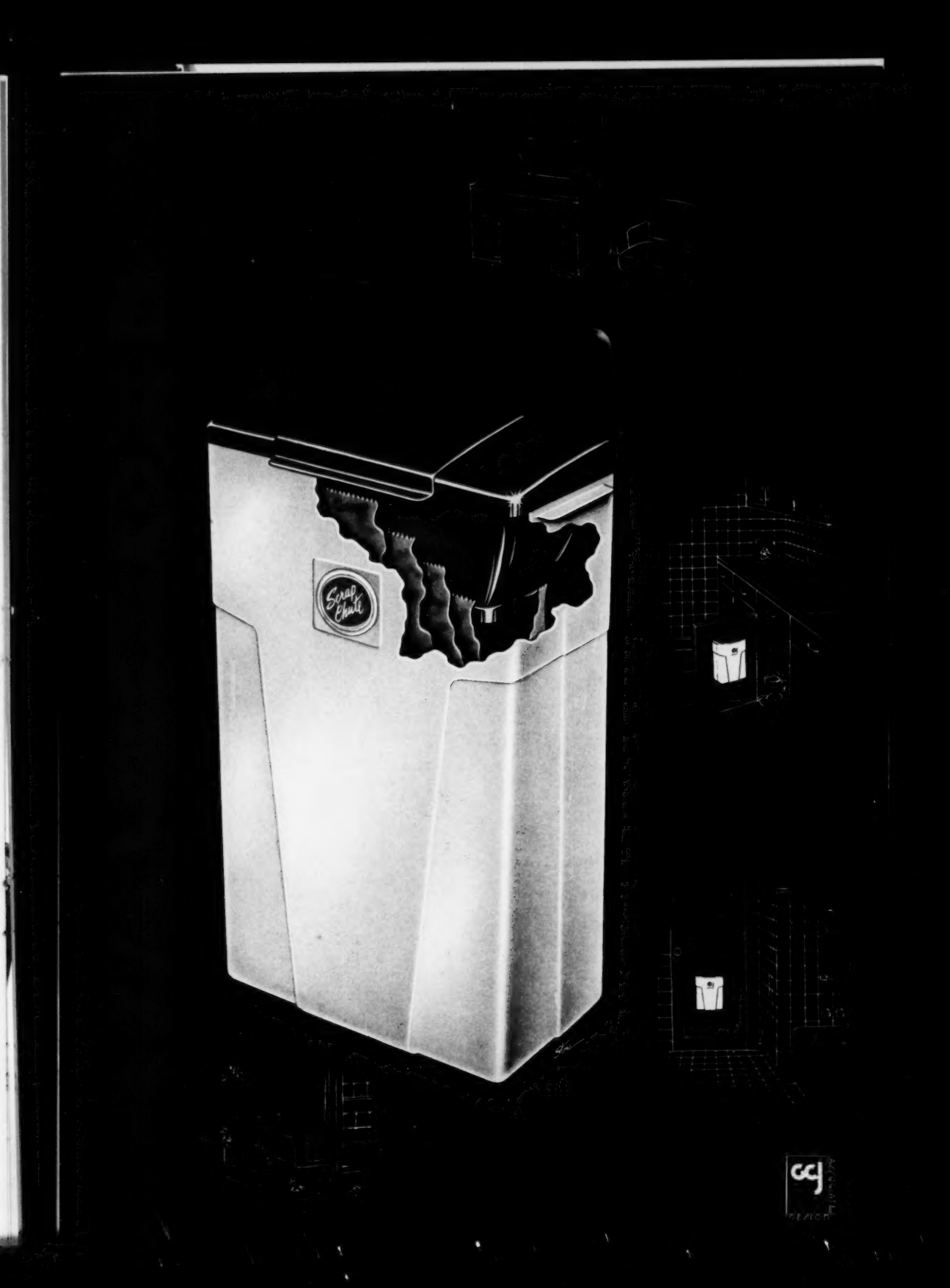
The pertinent questions—and how to get the answers—are: A) What to make? Market research on customer needs and desires. B) What material to make it of? Research to determine materials and processes. C) How to make it work? Design ingenuity, invention, engineering drawings. D) What to make it look like? Styling, sketches, models. E) What will it cost to make? Preliminary cost estimates—tools, material, labor, and overhead. F) What to make it sell for? Analysis of competitive market costs and the customer's pocketbook. G) How to sell it? Pre-selling in your own company, to distribution channels and jobbers, and advertising to end-use consumers.

The "Pin-up Scrap Chute" illustrated is an example of what happens when you take your coat off and go to work. It's not just another garbage receptacle or a *plastic imitation* of a step-on can. It has multiple uses and markets—for the home, hospital, office, hotel, etc. *It has multiple selling features:*

A) It's a more sanitary unit (here's where plastics come in), easy to wash and clean, and won't leak, rust, or stain. B) It's easy to work with, off the floor, out of the reach of small children, dogs, and cats. C) Installation: A unit can be installed at a convenient working level in a few minutes by any woman without the use of screws. D) Operation: Access lid can be opened with one hand or with edge of plate. Chute holds bags open and insures waste going into the bags instead of into the container or on the floor. E) Economics: It eliminates the inner can or liner found in current "step-on" cans, and utilizes standard 8, 10, 12, 14, and 20 lb.

(*Continued on p.* 194)

GERALD C. JOHNSON'S designs have covered a great variety of consumer, service, and capital goods products for a number of industrial companies. At present, he is at work on the development of new products for several of these companies, and for the U. S. Navy, Bureau of Ships, Army Chemical Center, and other divisions of the Armed Forces. Mr. Johnson is a member of the Industrial Designers Institute and of the Society of the Plastics Industry, Inc.


Scrap Chute

Plastics Futures

Schoolroom of the Future

by JEAN OTIS REINECKE

WRITERS of science fiction can take liberties with facts and cheerfully predict the technology of the year 2052; but the conscientious industrial designer is too well-informed about real facts and possibilities to be a sensational prophet. The best he can do is to project the known facts and problems of today into the realizable future. Our suggestions for the "schoolroom of the future" are really ideas that could be put into effect tomorrow. The plastics materials and the manufacturing skills exist to build our "schoolroom of the future" in the present.

Whenever it may be built, a schoolroom should be designed for the optimum health and working efficiency of students and teacher. It should be organized for comfort, convenience, and cleanliness. Its equipment should be adapted to the best methods of instruction in use when it is built. Adequate provision should be made for rest and recreation. These broad fundamentals governed the development of the scheme described below and illustrated at the right.

Our schoolroom is organized into two functional areas: 1) a classwork area, devoted to instructional activities, illustrated by the perspective drawing at upper right, and 2) a recreational area, illustrated by the perspective drawing at lower right.

Curtains for Light Diffusion

The schoolroom is oriented to face 20° off south to the east, with a complete southern exposure. To give the room complete visual access to outdoors, the south wall is of glass. There are two full-length outer draw curtains made of light-diffusing plastic material, and two inner draw curtains of opaque material. Suspended in front of the window is a molded plastic flower box arranged to link the room harmoniously with the outside landscape. The walls of the room are of plastic.

Visual education through sound films and television is now a reality. Our schoolroom provides, on the west wall, for television and motion picture projection screens (using rear projection) mounted in two plastic bezels. Above and below the bezels are woven saran panels where loudspeakers are mounted.

Another item of instructional equipment now in use is the tape recorder. To the right of the projection screens, two sliding panels afford access to the library of tape recordings and the tape recording equipment. Below, door panels give access to storage area for other training aids.

Extruded Rail on Chalkboard

Immediately adjacent to the screen area there is a perforated plastic panel for mounting displays and exhibits. This display panel is supplemented, as we turn the corner of the room to the north wall, by a dual green chalkboard unit with one swinging panel of laminated plastic or acrylic. The swinging panel contains a perforated plastic display board mounted flush above, while at the bottom there is an extruded plastic chalk rail.

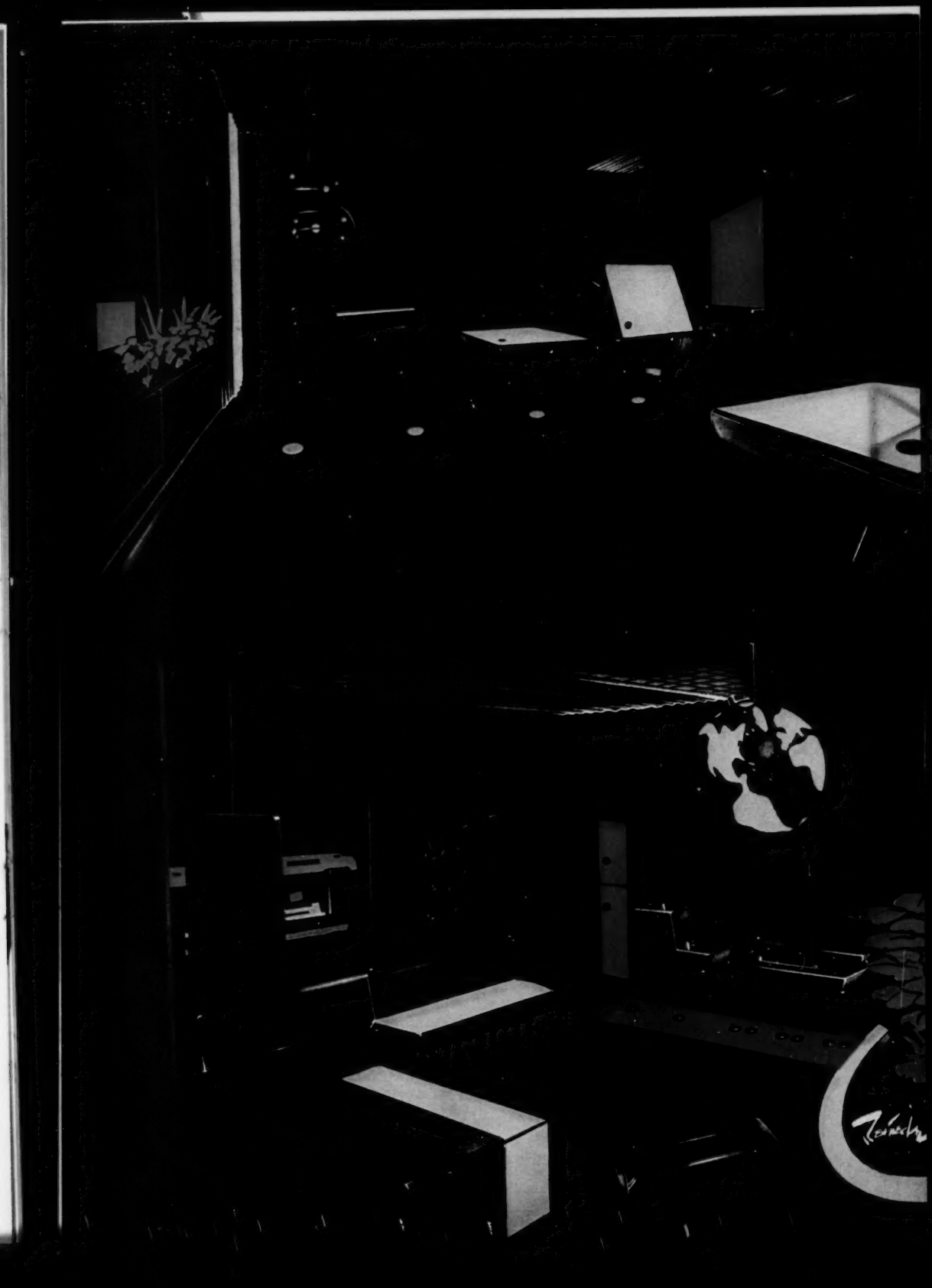
Below the chalkboard unit is a plastic bookcase with storage cabinets below. To the right of the chalkboards are plastic wall maps formed in bas relief and illuminated. This, too, is only a slight projection of present practices because three-dimensional maps have already proved their instructional value.

Directly above the chalkboard unit, there is a continuous panel of translucent plastic which acts as a skylight to balance the natural light from the south window.

The teacher's desk is of formed, molded, and laminated plastic mounted on phenolic plastic casters (easier on the floor than steel) to pro-

(*Continued on p.* 196)

JEAN OTIS REINECKE, of Reinecke and Associates, has designed or directed the design of over 5000 products in virtually every industrial classification. Winner of eleven MODERN PLASTICS Competition Awards, Mr. Reinecke has also received two Fashion Academy Awards, Electrical Manufacturing Awards, Wolff Award for Package Design, Art Directors Club Award, American Designers Institute Award. Secretary and director of Society of Industrial Designers.



Plastics Futures

Packaged Bathrooms

by MICHAEL SAPHIER

IN a nation so conscious of the comfort and health values of cleanliness, it is surprising that no manufacturer has ever created a packaged bathroom.

Of course, the traditions of labor in the plumbing field, and the conservative attitude of the construction field are largely responsible for the fact that plastics have not been granted earlier acceptance. In shipping and handling costs alone, savings to the American public in the increased use of plastics in bathrooms would be tremendous. The savings in construction labor costs by factory prefabrication would be even greater.

A peculiarity of the situation is that the materials and techniques for mass production of packaged bathrooms are at hand today. Copolymerization, the development of plasticizer-free materials, and improved formulations, have given us impact resistance, heat resistance, abrasion resistance, and flexural strength in light-weight, reasonable-cost plastics, while improvements in large-piece molding, accuracy of extruders, and better fabrication methods have made the proposition immediately feasible.

Built in Units

The packaged bathroom will, of course, never be reduced to "take home" size, but we do believe that it can successfully be "wrapped for sending." The sending will not be to the individual consumer. The bathroom would be packaged for architects and builders and would be delivered in any of three sizes with four possible use combinations. There are three units, each 32 in. wide by 8 ft. long. Unit 1, containing the wash basin and toilet, is the basic utility unit. As such, it could be used alone or in combination with either or both of the other units.

This utility unit contains, under the wash basin, a laundry hamper and a sliding towel rack. Above the basin and to the right, is a compartment for drying stockings, lingerie, etc. The heat for this compartment comes from beneath the basin and serves also to keep the towels and laundry free from mildew. The front of the hamper and towel rack is of woven plastic, through which the heat for the room area can circulate. The wall above the basin is mirrored. The medicine cabinet is behind the bottom two modules of mirror, and its two 16-in. wide sections take up the width of the entire unit. The basin itself, and the counter-top, are molded in one piece. The water valve controls and drain control consist of fluted plastic cylinders which are rolled forward or backward to open or close. To prevent the soap from softening, the soap dish has been deeply ribbed; these ribs also provide an overflow drain for the basin. The toilet seat and the cabinet in which it is enclosed take up the full 32-in. width of the unit; the cabinet is coved into the floor and walls to make cleaning easy.

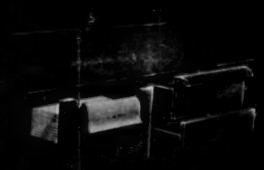
Unit 2 contains the bathtub and storage cabinet. The tub is designed to receive fittings for a shower should one be desired. All water valve controls conform in design with the plumbing on the wash basin of Unit 1. Three shelves of the storage cabinet can be reached from the toilet side of the cabinet, while two sections can be reached from the tub side.

Separate Stall Shower

Unit 3 adds to the basic bathroom the convenient features of a separate stall shower and a dressing table. The shower also has a fluted cylinder control which, in this case, acts as a mixing valve. The shower stall door is a plastic sheet which slides through the wall separating the toilet and shower. The dressing

(*Continued on p. 200*)

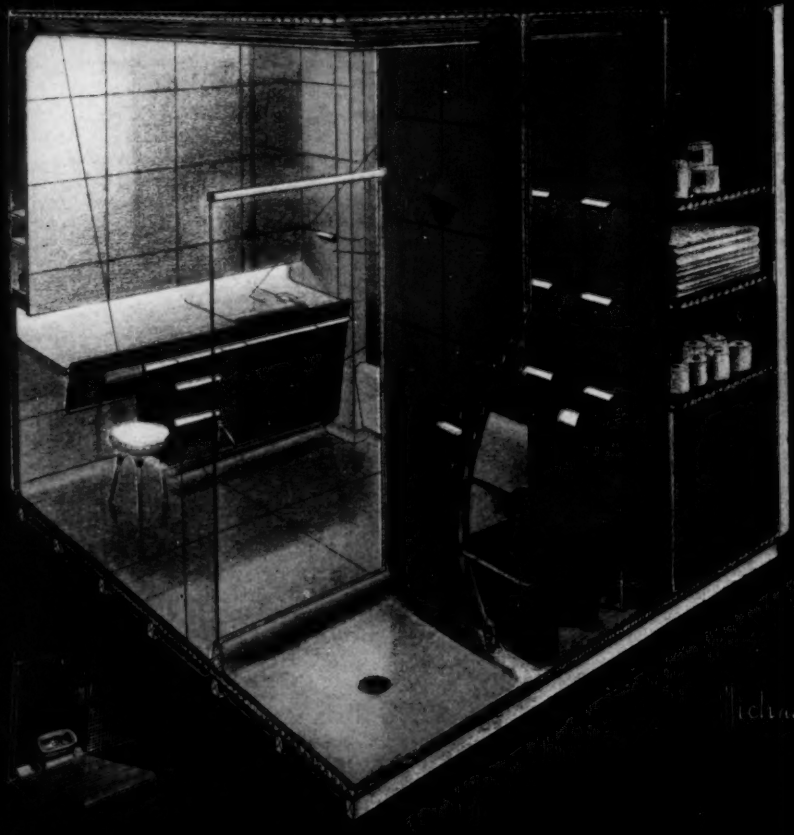
MICHAEL SAPHIER of Michael Saphier Associates was schooled at New York University, The National Academy of Design, and The Art Students League. Postgraduate work was in the offices of Henry Dreyfuss and Boris Aronson. He has had his own design organization since 1936. The design efforts of this firm have encompassed widely diversified activities in a number of fields, including packaging and graphic arts, product, display, and commercial interiors and exteriors.



VIEW OF WASH BASIN

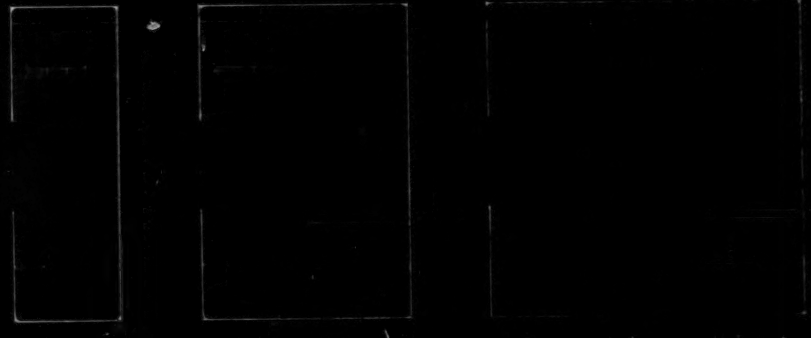
TISSUE DISPENSER DRAWER

HAMPER & TOWEL RACK



DRYING COMPARTMENT

FOLD AWAY SEAT



UNIT

Plastics Futures

All-Weather Stadium

by ALEXANDER KNOWLTON

A LARGE hall capable of accommodating large gatherings such as political nominating conventions is sorely needed in New York City. The world's largest city also needs an outdoor stadium capable of seating up to 100,000 people. With the help of plastics, New York could fill both those needs with a single structure.

A stadium to meet these requirements could be built of reinforced concrete. If it had two tiers and had an outside diameter of 800 ft., it would be big enough to contain a football gridiron or baseball diamond and seat 100,000 spectators. All this is quite conventional. Then plastics enter the picture.

I am convinced that a thoroughly practical retractable roof for such a stadium could be made of reinforced plastics. The roof could be made in about 24 segments which meet at a point in the center like the portions of a pie. Each segment would thus be a triangular piece 400 ft. long and less than 100 ft. wide at the base of the triangle.

These segments could be hinged to the top of the outside wall of the stadium and counterweighted so that they could easily be raised to a vertical position to open the stadium or lowered almost to a horizontal position to make an all-weather stadium or convention hall.

These roof segments could be made of translucent sheets of Fiberglas-reinforced polyester. Because of the strength of this material, relatively small light metal girders would probably be sufficient. To make sure that the roof never has to bear a snow load, low voltage "defrosting" wires could be embedded in the top surface of the plastic. Snow could then be melted as it falls.

Half of the reinforced plastic roof segments would have U-shaped channels running the length of each side. The other segments would have down-turned lips which would nest in the channels of the adjoining segments. The channels would then serve as gutters to drain off any rain or melting snow. When the roof is opened, the segments with down-turned edges would be raised first and the segments with upturned channels would follow them up. The entire opening or closing operation would only take a few minutes.

When the roof is open, each segment would tower 400 ft. above the top of the stadium wall, or almost 600 ft. above ground level. Thus, each segment would have to bear a flashing red light to warn approaching planes. The inside, or under side, of each segment could also bear the lights needed to illuminate the stadium or convention hall at night. The tall segments could thus take the place of the light towers usually used in ball parks for night baseball.

Because of its translucency, the plastic roof would bathe the roofed-in convention hall in light during the day and would give forth a beautiful glow visible from miles away when the hall is illuminated from within at night. And even with the stadium open, the tall plastic segments would keep out most of the annoying afternoon sun glare without keeping out light.

On the scale indicated, the outdoor-indoor stadium would be a practical solution to New York's needs—and a Mecca for sightseers. People would come from miles around just to see the roof being opened or closed at night. And there is no reason why the same plan, on a smaller scale, could not be used in smaller cities to build combined ball parks and meeting halls. Similar roof constructions might also be useful for restaurants, night clubs, and hotel roof gardens.

ALEXANDER KNOWLTON is a practicing architect and the Architectural Editor of *Living for Young Homemakers*. He has designed many modern homes and buildings in Norway, France, and Great Britain, as well as in this country. He was associate architect on the El Panama Hotel, Panama, and on the Empire Race Track and the Roosevelt Raceway. He is a member of the American Institute of Architects and the N. Y. State Association of Architects.

Plastics Futures

Changing the Kitchen Scene

by BELLE KOGAN

SINCE the average woman has become extremely color conscious, and is more aware of the influence of color in her surroundings than ever before, it is strange indeed if she does not at some time rebel against all-white kitchens—or at least wish for a change of scene or color in the room in which she spends a large percentage of her waking hours. Unfortunately, painting an entire set of kitchen cabinets is a tiresome and messy chore. If some enterprising builder will contract for cabinet doors which will allow a change of panel easily and inexpensively, our housewife will have plenty of opportunity to exercise her taste for color and design, and satisfy her craving for an occasional change.

The kitchen illustrated shows removable laminated panels which slide into a plastic frame which is easily applied to a plywood or Masonite panel. These panels can be made out of any sheet stock on the market, and are an inexpensive method of decorative application. Simplicity of removal of the panels would encourage the housewife to give herself a change of color and decoration at different seasons of the year, in the same way that she places cool-looking slip-covers on upholstered furniture for the summer. At the moment, the only outlets for exercising the homemaker's individual taste in kitchen decor are in changing curtains and shelf-trims, which usually proves rather inadequate. The panels should be coordinated in design with popular colors of plastic dinnerware, place mats, and dinette sets, so that a pleasing and colorful unit will be produced.

The cannister rack and containers can be assembled into various size units and built into a counter or cabinet of table height. This eliminates reaching up over a sink or stove, and makes the cannisters far more accessible and easier to use. The rack can be hung on the wall, if preferred. The frame is built so that the heavy band across the front of the container fits in smoothly; the containers are transparent so the contents can be seen, and the handles make them easy and safe to use. The larger containers built to hold a pound of coffee, sugar, or flour, have a pouring spout at the far end. The small containers hold salt, pepper, herbs, or spices, and have small holes in the cover.

Plastics as I See Them

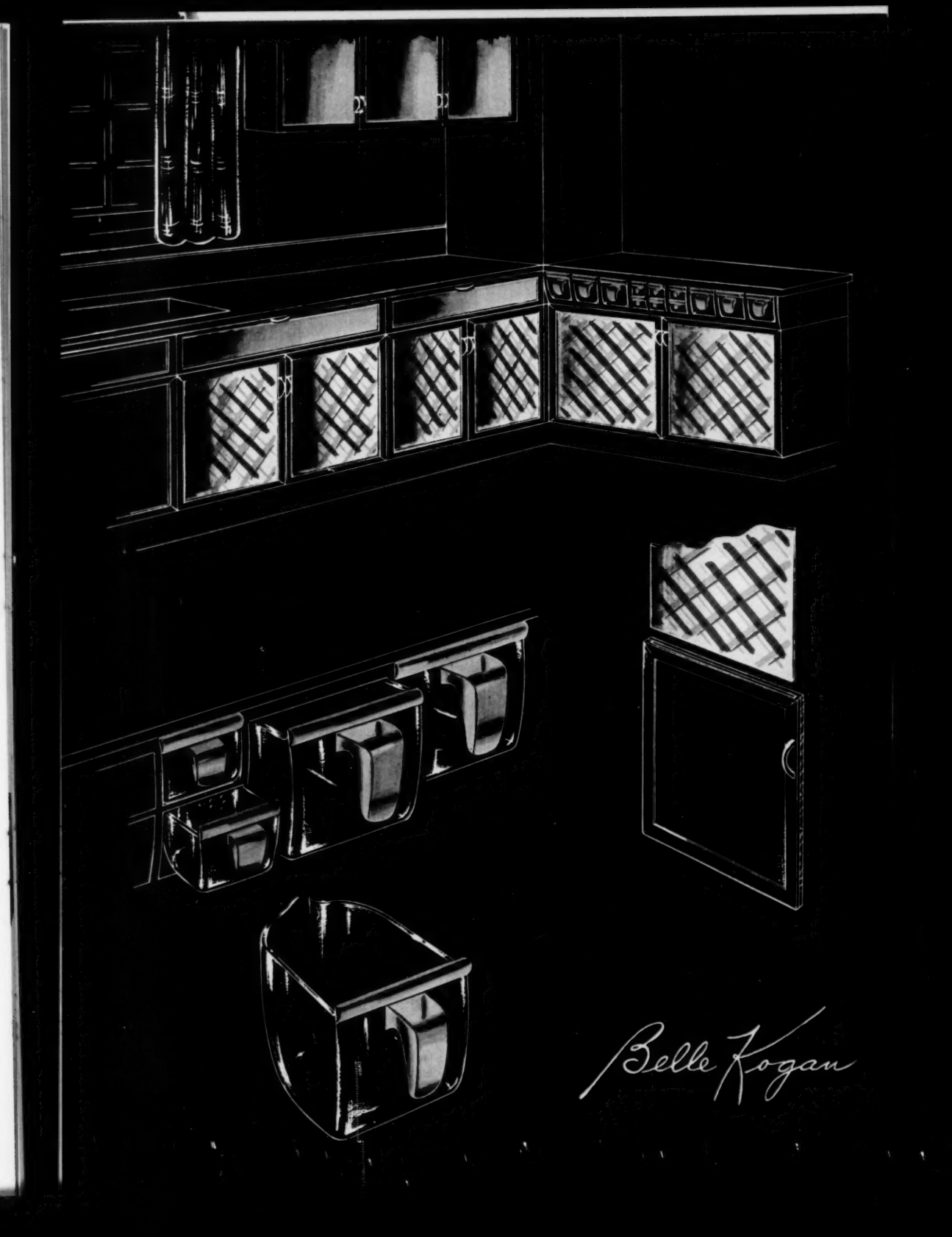
From portrait painting to plastics via silverware is the road by which I came into this field. Through re-examining the past, we can perhaps foresee the future.

My first work in designing was done for a cast metal novelty manufacturer. In trying to develop some new items, the president of the firm and I investigated the strange (to us) field of plastics. Our idea was to use plastics in conjunction with metal, and thereby create something different and exciting in the way of decorative and table accessories. This was 1929, just before the beginning of depression days. At that time, acetates and phenolics were the best known materials available, but phenolics were made only in black and brown. Our search for a more colorful material led us to a small plant making a casein plastic which had not yet attained perfection. We pitched in and worked out a set of colors, designed forms for turnings, and then tried them out. We came to grief because our material refused to stay where it was put. After some experimentation we reluctantly abandoned the idea of using plastics in the line.

I can clearly remember the rumors going the rounds: someone was making a plastic material out of sugar, someone else out of this or that. However, it wasn't until I opened my studio in New York in 1932 that I ran into the problem of

(*Continued on p. 202*)

BELLE KOGAN, specialist in home furnishings and accessories, has designed many lines in ceramics, glass, silver, plastics, and wood over a period of 20 years. Miss Kogan has maintained her own studio for that time, and is co-owner of the Quaker Silver Co. She is a Fellow of the Industrial Designers Institute and is highly active in the work of the Institute.


Belle Kogan

Plastics Futures

Ceramic Tile + Plastics

by J. GORDON LIPPINCOTT

ONE of the unique qualities of plastics is their ability to combine with older materials, extending their usefulness in developing new markets. Good examples of this lie in resin bonded plywoods and veneers where an old material, when combined with plastics, has appeared in new products and new applications. One thought that has occurred to us is that one of man's oldest materials is ceramic, and over the years few changes have occured in this medium. Yet ceramic tile has some characteristics that are truly unique. Its surface is hard and scratch resistant—one of the best we have. It is available in all the colors of the rainbow and the raw material from which it is made is abundant and cheap. Yet tile has not been growing year by year in general acceptance and in new applications with anything like the rapidity of some modern synthetic materials. Very possibly, if ceramic were combined with plastics, new growth would be experienced.

The ceramic tile industry is plagued with two primary problems: First, the tremendous inventory involved in sizes and colors; and second, the lack of mechanization either in mass production at the factory or in installation on the site. In other words, while tile is made up of an abundant and inexpensive material, its cost remains very high because of labor.

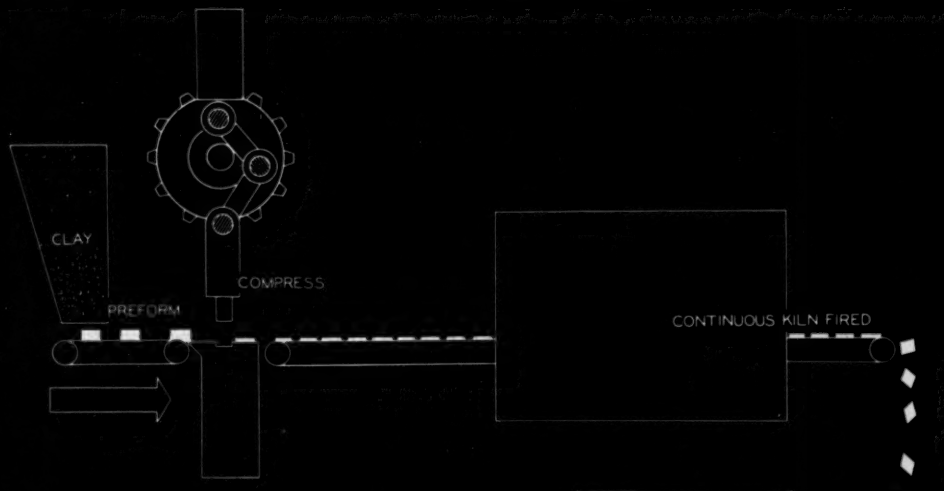
We believe that research in this field could of helping to solve both these problems. Visualize a new material where small tiles, possibly ½-in. square and ⅛-in. thick, are made in completely automatic machinery by mass-production methods. The clay is dry compressed to a tablet and is fired in conventional continuous kilns. It is then oriented in whatever patterns are desired and bonded with plastic sheeting so that the plastic would provide a supporting medium and the mosaic tile the color and wear medium. This material could be shipped in rolls and could be laid with an adhesive in a manner similar to linoleum. It would completely shortcut the costly tile setters' "skills" and would use the linoleum layers' techniques which are far faster.

Also, there is a substantial market in this country for flooring and wall materials to be installed in the home by the owner. Up to now, the tile industry has never been able to appeal to this type of buyer since setting tile in cement is such a difficult task. Tile bonding by plastic would produce a much easier medium to install and hence could appeal to a much broader mass market, including mail-order outlets.

We believe that research in this field could result in a tile-plastic combination that would have wearability exceeding the best vinyl flooring materials, with many new and interesting possibilities in colors and designs as well. It could do for the tile industry what plywood has done for the lumber industry.

The first and obvious use is flooring, but it also, of course, could be used on walls, table tops, counters, etc., and it could be an outdoor as well as an indoor material. The main problem, as we see it, is to search out the material that will make up a properly bonded tile and last as long as a material that still looks new after several hundred years of use.

J. GORDON LIPPINCOTT (right) and WALTER MARGULIES have brought their firm of Lippincott and Margulies, Inc., in the short space of only eight years, up to third place in the highly competitive industrial design profession. In this period they have served clients whose products include soups, aircraft, candy, typewriters, and vacuum cleaners. Hotels and retail drug outlets have also profited by these designers' skills.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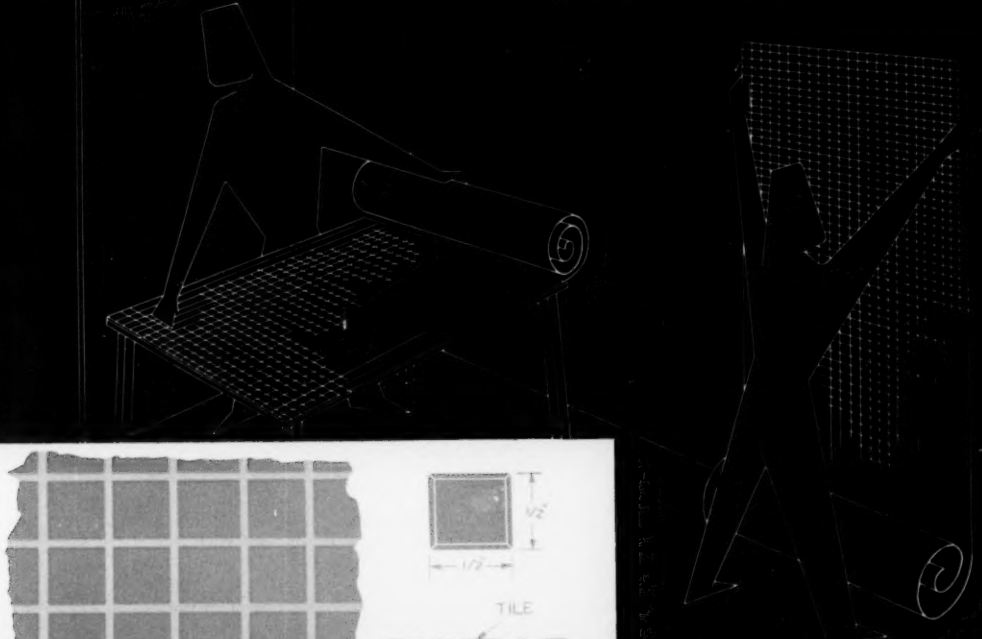

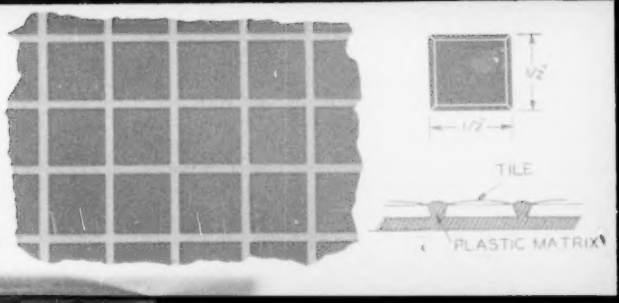
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TILE
PLASTIC MATRIX

Plastics Futures

Projects for Cellulosics

by CARL SUNDBERG

WE share with many other designers the conviction that the real markets for most existing plastics materials have barely been touched, and that the big future for plastics lies in the direction of exploring market areas which up to now have shown little evidence of being "plastics-minded." We have designed plastics products for many of our clients, recommending these materials over all others when we felt they would be best for the job. In almost every instance our faith in them has been justified. Among the great advantages of the plastics as a family of materials is their ability to provide more merchandising features and details in a product, without adding to its cost. A properly designed plastic part usually improves both the appearance and function of a product, and in many instances the use of plastics in a design has brought products out of the luxury class and into the profitable mass-market areas.

Our own major interest in plastics right now is in connection with a plastics material manufacturer retaining us to provide design assistance in the promotion of the types of plastics produced by this firm. As a result, we feel closer to this specific field and its problems than we do to any other sector of the industry. This discussion is therefore being deliberately confined to "Future Design Trends in Cellulosic Plastics."

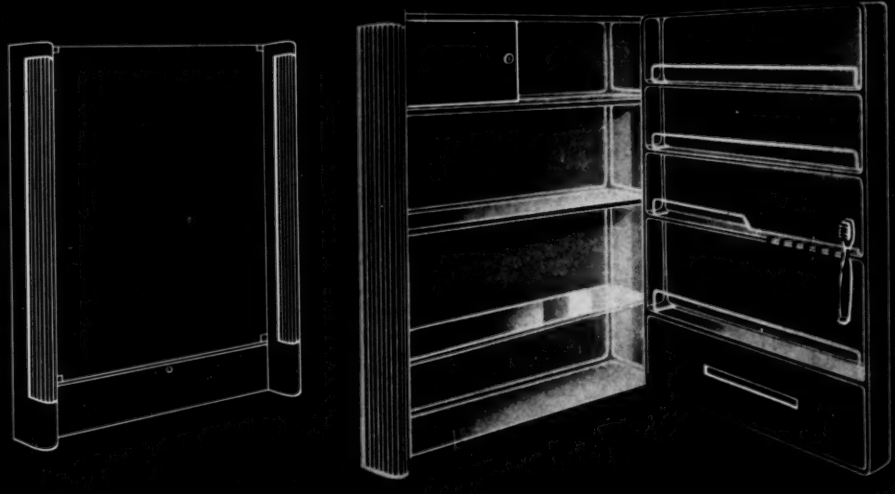
Naturally, some peculiar problems arise when a designer confines his consideration to products made with one specific type of plastic material. He not only automatically limits his application range because of the physical characteristics of the material he has to work with, but must face the economic facts of life. Some products that might readily be designed to make use of the cellulosic plastics—in fact, could be better products if they were made with these materials—simply can't, due to their cost, employ them and maintain a competitive price structure. This is especially true in the toy field, and to some degree in such markets as personal goods, housewares, and novelties. There are few occasions today when the designer is given a free hand to find the "ideal solution" to a design job. He must, instead, be in full sympathy with the problems of both engineering and sales, and consider himself part of a team working to achieve a final design which will be successful economically as well as aesthetically.

Offsetting these handicaps, which would tend closely to limit the design range of the cellulosic plastics, are two new important developments in today's economic picture which should open many new fields to consideration. These two factors—the advent of large-capacity injection molding machines, and critical shortages of some non-plastic materials—will make it possible to evaluate the cellulosics for several important major markets. A few of the possibilities and trends which may result from this condition are visualized in the suggested designs appearing on the opposite page. Care has been taken to keep the suggested designs to the barest outline so that the reader will not be confused in his thinking by any stereotype. Each design represents a basic idea rather than a completely developed visual for a new product. The important thing to consider in studying any of these designs is the fact that these products, not currently made with plastics, can become plastics products; can be produced at comparable or lower cost than existing products; and offer important merchandising features and details not now available.

The medicine cabinet illustrates the dramatic possibilities of the use of large molded units in the production of important structural parts for building and architecture. Proper design makes

(*Continued on p. 207*)

CARL W. SUNDBERG has been designing products for the plastics industry for more than 16 years. A member of the firm of Sundberg-Ferar, industrial designers, Mr. Sundberg has worked since 1948 with Hercules Powder Co. in connection with a unique program of design assistance made available to users of cellulosic plastics. Products developed through this service include small-motored electrical appliances, tools, decorative lighting, packaging, and toys.



Plastics Futures

Furniture That Grows

by GERALD STAHL

FOR several years past, there has been much discussion in the plastics industry and in the furniture industry about the possibilities for increased use of plastics in case goods furniture. Especially since the development of big capacity injection machines and compression presses, and the creation of relatively low-cost dimensionally stable thermoplastics, the obvious advantages of big molded plastics pieces in furniture have been the inspiration for considerable research on the part of industrial designers.

A major problem has been that of the fundamental economics of mold-making. Styles of furniture change in detail with some rapidity, and a production run on any one style is likely to be far short of the number that would have to be made to justify an investment of many thousands of dollars in molds.

We believe that a fundamentally sound approach to the problem is to consider each piece of case goods as an assembly of basic components. Drawers are drawers, tops are tops, backs may not be necessary, and ends and feet may be eliminated by simple structural coupling and separating members.

With a group of "standard" molded and extruded components, it should be possible to produce dressers, buffets, desks, tables, and even couch frames to which separate upholstered padded units could be added.

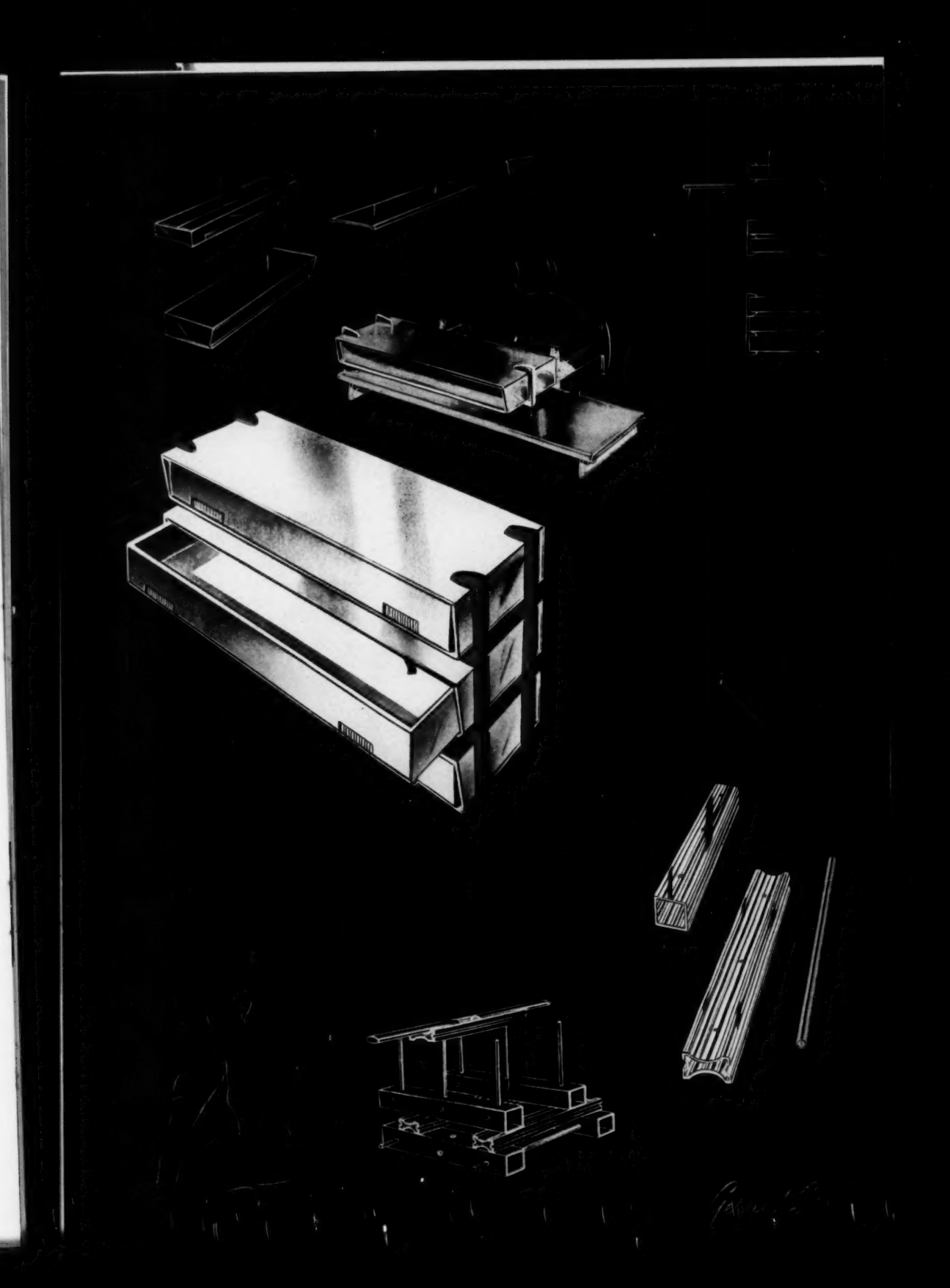
From a utility standpoint, it is probably desirable that such a concept of plastics furniture be introduced where the furniture will sustain the most abuse. The nursery is the logical spot, because there furniture must withstand impact, abrasion, chemicals, moisture, and torsion, and be bright and shiny-clean at all times. The advantage of eliminating glues in assembly and paints and enamels in finishing is tremendous.

Furthermore, there is a problem in merchandising quality nursery furniture, particularly in small families where it's not "handed down." Our project was to design children's furniture to serve, with mere rearrangement of components and the purchase of a few added components, from the ages of 2 to 12. We developed four simple modules to be molded completely out of plastics: an injection molded drawer, a drawer frame, and two structural members that key the units together, and also serve as legs and ends. Tops of case goods, or table or bench surfaces, would be formed of decorative laminates in standard lengths.

The same components which when first purchased would form a nursery bureau, by rearrangement and addition would grow into a child's play table, a bookcase, a chest of drawers, or a modern end table. While the original color of the set would last the lifetime of the furniture, suitable trim and decoration at any age of the child and for either sex could be supplied by the use of decalcomanias, vinyl valances, etc.

And while we were studying the child and his needs in furniture, we took a long look at plastics toys. Here we found a whole host of authentic miniature reproductions of everything from the solar system to a dump truck, but a decided paucity of modular unit types of plastics toys with which the child could be given an opportunity to do some creating on his own by assembly. So we have included in our visualization a few thoughts on this subject. With colorful, sanitary, non-shattering, warm-to-touch plastics, there are great possibilities in educational toys, and the combinations possible with extruded components, molded sections, and laminates, are literally infinite.

GERALD STAHL, designer of a wide scope of products that encompasses safety razors and clothes pins as well as major appliances and heavy-duty equipment, complements his knowledge of design and styling with a technical background of engineering training. During the war, he was engineering officer, first of experimental flight test and development of the B-29, and later of the bomb group that handled atomic bomb operations against Japan.



Plastics Futures

Reinforced Plastics Concepts

by J. McLEOD LITTLE

GARBAGE containers and telephone booths have been with us for a long time; however, we believe they can be improved through the use of new methods and materials. The designs shown on the opposite page are predicated on the use of molded and laminated fibrous glass reinforced plastics. With their great strength and resistance to wear and tear, these plastics allow the designer considerably more latitude than he generally enjoys with other materials.

Any manufacturer contemplating the molding and fabricating of fibrous glass reinforced plastics must be ready to give serious attention to adapting his plant layout, techniques, and operations for the most efficient and economical production.

Designers and engineers, because of their constantly projected thinking and planning for the future, are always ready to consider a new method and material with an open mind and base their considered decision of its fitness on facts and figures. This openness of mind is notably not true of the general public. They must often be weaned away from old traditions and acceptances of long standing. Hence the sales and promotion departments of manufacturers must be ready to tackle the job of paving the way for public acceptance of new projects.

Telephone Booth

The design for a telephone booth is an interesting application of reinforced plastics. It is unusual in that it is a structure for use either indoors or out. The design is simple in form; the material, unlimited in color range and surface pattern, permits selections to conform with the color scheme or decor of any location in which it might be used. If used out-of-doors, no extremes of temperature or humidity would cause this structure to rust or rot. The interior may differ from the exterior in mat pattern and color. No painting is needed, unless desired! The top is pitched and formed to shed snow and rain to the rear. The material is fire resistant.

The booth could be free standing, saving what is very often valuable wall space, or the booths may be lined up side by side, in which case the transparent material may be omitted from the sides.

This hard surfaced, tough material discourage the wood carvers, public building poets, and artists. Any defacing that might occur is made less obvious by the random pattern inherent in the glass fiber mat and pigmentation. Penciling can hardly be discerned and is easily wiped off. Installation of a permanent "doodle board" for needed telephone notes as well as amusement might be considered.

Basically this booth is constructed of two shells, one nesting inside the other, with space between, and joined together about the periphery with suitable rivets. The shells are simple in form and are designed for easy laminating of glass mat and resin. Initial tool cost should be comparatively low. Small holes in the upper part and ceiling of the inner shell or liner are for sound absorbing and ventilating purposes. Insulating material, possibly fibrous glass, is cemented to the inside of the outer shell. Noncorrosive metal corner posts, the bottoms covered by a return flange of the inner shell, extend from top to bottom. Metal "H" section is used to frame the glass and to cover the joining of the two shells in this area.

The seat is an integrally molded part of the smooth inner liner. There are no open wooden joints or splinters to snag nylons or other clothing. Since the floor will receive abuse in excess of the other areas of the booth, a separate molded and replaceable mat for under-

(*Continued on p.* 210)

J. McLEOD LITTLE attended the Minneapolis School of Art and the Art League of Minneapolis. Before establishing J. M. Little and Associates in 1943, he was connected with Batten, Barton, Durstine & Osborn, Inc., and Van Doren Associates. He is a member of the Society of Industrial Designers and of the Society of Plastics Engineers. A design by J. M. Little and Associates won a first award in the 1943 MODERN PLASTICS Competition.

TELEPHONE
TICKETS

Plastics Futures

There's a Science to Seating

by ROBERT L. GRUEN*

THE efficiency of our factories depends to a large extent upon the well-being of the human element. A large percentage of workers sit at their jobs, or should be able to; and for maximum efficiency they should be comfortable and at ease. A chair that is good for a few minutes may be very uncomfortable after continued sitting because it fails to conform to and completely support the body; instead, it forces the body to conform to the chair or to support itself.

The cumulative effect of day after day sitting in ordinary seats, trying to adjust the various parts of his body to more comfortable positions as he goes about his various job motions makes any worker more tired and less efficient over a period of time. Since posture and health are closely related, it is logical that good posture will increase the feeling of well-being and comfort, and anyone who works from a supported position will feel better. He will become more relaxed, his health will actually improve, his capacity for production, both in quality and quantity will improve, as will his general morale.

For many years industry has been busily engaged in devising jigs and fixtures to present the work to be done in an optimum position, while very little effort has been made to reduce the number of awkward or fatiguing positions which the worker has been required to assume in order to carry on the work. To solve this over-all problem, Helen Merit has approached it from a more logical starting point. She believes that the worker should first be placed in an optimum position, and the work should then be brought to him. She has worked out certain principles and measurements which we have followed in designing the chair known as the Merit Chair (patents applied for). The design is based upon the results of the many years of work and study which she has devoted to the subject.

This chair is not just something to sit on. It is a fixture that places the worker in the best position for free, natural, and easy movement at work. It relieves him of the need for maintaining posture at the expense of nervous and muscular energy that could be used in doing his job. It provides a sling that supports the entire figure from the knee to the shoulder blades. Because the chair comes in a range of sizes, it can be fitted to the individual worker. The area supporting the body is thus increased about 500%, resulting in a proportionate reduction in the lb./sq. in. supported by any part of the seat.

In the Merit Chair the seat is a flexible fabric support allowing limited motion in any direction without reducing the amount of support. The individual sitting in this chair finds his seat cradled slightly lower than his knees. This relieves the pressure from the underside of his thighs which in other chairs causes a circulation problem. The side supporting rails taper somewhat toward the front, creating the proper amount of pressure to the outside forward parts of the thighs, so that they are supported in a partially closed position. The back of the seat has a pocket containing a pad which touches the small of the back, and which can be adjusted to fit variations in individuals using the chair. All of these factors combine to uphold the spine, and straighten it. When a person allows his body to slump forward his lungs become cramped, and therefore his breathing is somewhat affected, he loses energy, and all his reactions slow down. Thus, the erect spine is the best work position.

In many kinds of work the arms must be able to move around freely. In this chair, the back tapers upward so that the arms can swing in

(*Continued on p. 214*)

* Copyright 1952 by Robert L. Gruen

ROBERT L. GRUEN is head of Robert Gruen Associates, a firm based upon the idea of total industrial design service to its clients, including product design, packaging, and business interiors. Starting his career as a scenic designer for the stage and motion pictures, he started to concentrate on industrial design in 1940. Mr. Gruen is a Fellow Member of the Industrial Designers Institute and is currently Chairman of the New York Chapter.

Plastics Futures

Disposable Rainwear

by EGMONT ARENS

DID you ever see a magician pull all the flags of the United Nations out of a thimble? The secret of that trick is that the flags are printed on silk so sheer that they can be compressed into a tiny space. Every time I see a magician do an act like that it makes me wonder why the idea hasn't been applied to garment design. If a whole garment could be capsuled into a tiny package no bigger than a cigarette package you'd have something to talk about! Imagine a dress that could be carried in a lady's handbag!

My dream remained a dream until just the other day, when Harold Parsekian walked into my office with some new vinyl film, fresh out of U.S. Rubber Co.'s laboratory. This material was so thin that enough to cover the average size woman could be folded into a package no bigger than a cigarette pack.

The amazing thing about this vinyl film was that, in spite of its thinness, it was strong enough to resist considerable tearing action.

It seems that this film is made by a brand new method of manufacture in which an extruded tube is expanded by air pressure to produce a film of extreme thinness, uniform throughout. The vinyl sets "in a matter of seconds." This is a continuously moving process. The vinyl material keeps flowing out of the extruder die, is expanded by the air, and is then passed between rollers which flatten it into a ribbon-like tube, all in a single operation.

Would it be possible, by some quick and inexpensive manufacturing process, to turn this tube into an article which could be used, for instance, as a rain cape? If that could be done, would it be possible to package the rain cape in a very small package, so that it could be sold from vending machines at a very low price? According to merchandising men it would be ideal if such a cape could be sold for 25¢.

Since vinyl film can be heat-sealed, it occurred to me that the tube, as it came from the rollers, could be run through a machine which would at one stroke form the hood and shoulders of the cape. With the same stroke of the press it could also be die-cut into the cape shape. The next process would be merely to attach reinforcing tape from the top of the hood down the front of the cape, also by heat-sealing, and then to slit this tape open, leaving half of the reinforcing material on each side of the cut. A gaily colored vinyl ribbon around the neck, heat-sealed at the back of the neck, would be the only other attachment needed.

Costs Kept to a Minimum

This film, so far, has only been made in a pilot plant in the laboratory; therefore, manufacturing costs have not yet been determined. However, it looks as though the processing and packaging cost could be kept to a very low minimum, so that the finished package would not cost more than, let us say, twice the cost of the vinyl. Distribution costs would be hard to figure until we had some idea of the volume that such an article might run into.

Of course, whether or not the rain cape is feasible from a manufacturing and sales point of view, there are many other applications for a film that is strong enough to handle in spite of extreme thinness. A waterproof covering that can be folded up into a miniscule package would be a boon to picnickers, cowboys, fishermen, soldiers on parade, motorists, shoppers . . . you can go ahead and write out your own list. The possibilities are fascinating.

EGMONT ARENS, design and color consultant to a number of leading manufacturers and a past president of the Society of Industrial Designers, has applied his techniques to a broad range of problems, including electric equipment, home appliances, business machines, and dress design. He is probably the first industrial designer to install his own plastics laboratory; his particular interest is in reinforced plastics, molded plywood, and low pressure laminates.

RAIN
Capes
25¢
FOUR COLORS
RAIN
Capes

Plastics Futures

END USERS LOOK AHEAD

To prepare the accompanying article, *Modern Plastics* editors approached the plastics experts of representative major end users of plastics in various fields. The starting question in most cases was: "What do you see as the outstanding new applications for plastics in the next five to ten years?" These men, all thoroughly familiar with today's applications and with the needs in their own fields, were full of ideas and anxious to talk about them. In many cases, however, they expressed some reluctance about making specific predictions if these predictions were to be attributed directly to them.

To avoid any embarrassment to any of the men who so cordially cooperated with the editors, it was decided to withhold all credits or acknowledgments. As a result, the Plastics Futures surveyed in this article are the consensus of a large group of "contributing editors" who, regretfully, must remain anonymous.

WHEN asked for predictions as to the future applications of plastics, almost every "contributing editor" started by saying, "Well, there will undoubtedly be more . . ." and then proceeded to describe the most successful recent applications in his own field. Recently adopted successful applications will undoubtedly be more widely adopted and new applications will result from the logical extension of their principles. But this part of the future is as obvious as it is inevitable—and need not concern us here.

Plastics Futures is mainly concerned with applications in various fields which have not yet been achieved with plastics—but which may soon become realities. Some of the problems have not yet been attacked because the plastic with all of the required properties is not yet available. Others are awaiting the development of better methods for processing presently available plastics which, so far as their properties are concerned, could do a given job. Still others are held up because the plastics which can do the job are, at present, too expensive. And finally, there are applications which would be entirely practical from the standpoint of properties, engineering, and economics—but which do not exist because the time is not yet ripe psychologically. Top management and/or consumers in certain fields are not yet ready to accept plastics in certain applications.

All four of these barriers in the path of plastics' progress are constantly weakening. New materials are being developed with improved properties; new processing methods are being perfected; the price of plastics in comparison to that of other materials is constantly decreasing; and management and consumers alike are slowly but surely learning to give higher respect to plastics and to accept them in still more widely varied applications.

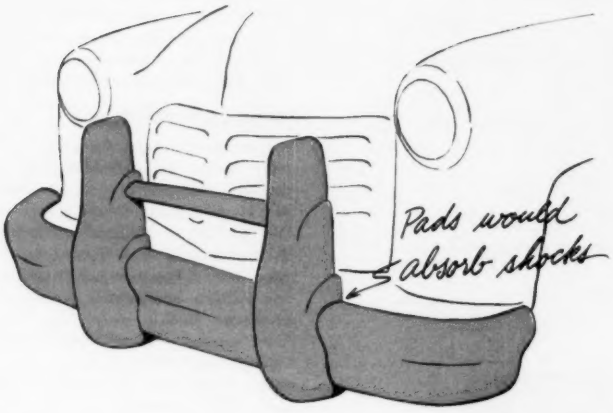
What does all this mean in terms of specific applications of plastics? The best answer is the consensus of the experts in various fields when asked: "What are some of the things which have not yet been done with plastics in your field which are likely to be done in the future?"

Faired-in or unusually shaped automobile headlights will be economically practical when acrylic material with reduced porosity is available for use in sealed-beam headlights

AUTOMOTIVE

"Expect the impossible of plastics" is a statement made by a representative of one large motor car manufacturer when questioned about Plastics Futures in the automotive field. This same engineer laid stress on a problem common to most large organizations. Boiled down, the problem amounts to the necessity for selling the idea of expanded uses of plastics to top management, to the people who make the final decisions. This involves a continuing educational program, and usually means the overthrowing of many preconceived ideas about materials before the advantages of plastics can be driven home.

As an example, automobile people



Instead of expensive chromium plating, auto bumpers could be covered with colorful vinyl; pneumatic or semi-pneumatic vinyl pads could be placed at probable impact points

foresee plastics coming into wide competition with die castings. Die castings have been entrenched for so long in the automotive mind that competition from new materials is almost unthinkable—until, of course, the case is proved beyond a shadow of a doubt.

Bodies

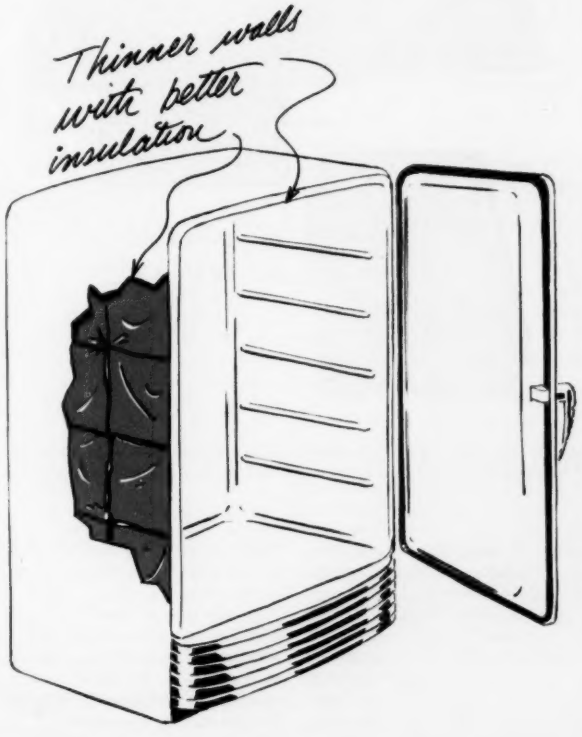
Perhaps the biggest possibility for huge volume use of plastics in automobiles lies in the reinforced plastics field. One body manufacturer envisages a day not too far in the future when there will be no more two-door and four-door sedans, as such, manufactured. He feels that they will be replaced by the so-called "hard top" convertibles and that the tops will be formed of reinforced plastics with a fibrous glass base. With proper design there will be no necessity for interior trim; molded-in ribs will give ample strength. In addition, the color will of course be an integral part of the tops; painting and later refinishing will be completely eliminated.

Other automotive engineers go even further. One puts the picture of reinforced plastics this way: "It is not entirely day-dreaming to foresee such parts as fenders, deck lids, hoods, and even roof panels made of plastic laminates on the car of the future."

Another, while emphasizing that the problem of fastening formed reinforced plastics parts is a big one, anticipates the reshaping of body design thinking toward the production of entire automobile bodies out of reinforced plastics parts. These, with the new thinking, would be fewer in number than the present sheet metal parts and there would not be so many joints to make as at present. Where spot welding is presently used with sheet metal, it is entirely possible that a similar welding process, using heat and/or cements, would produce an automobile body that would be amply strong for the purpose and would have the tremendous advantages of being non-corrosive and having "built in" color and finish.

Design Simplification

What this would mean in the simplification of automobile body design and fabrication is not difficult to imagine. Reduction in the number of body parts would reduce the



Refrigerator walls could be thinner if insulated with glass batts sealed in plastic film. Film would have to be impervious to gases, such as Freon, which would replace air

Folding carton made of transparent plastic sheet printed on the inside would have depth of appearance. Unprinted parts of box would make strong windows, yet not add to cost

number of assembly operations; adequate welding methods would speed final assembly; and the color and surface finish of reinforced plastics would eliminate paint spraying and final polishing.

But the automotive body picture for the future is not all rosy. The plastics industry still has to provide the answers to a number of questions. In all cases it is assumed that the cost factors will balance out; the highly competitive position of automobile manufacturers makes this a basic, primary must. Then, too, even the best of reinforced plastics of today can still be improved. Uniformity of composition, uniformity of forming in the press, uniformity of color, and uniformity of final finish can still be improved.

To be shown at the Fifth National Plastics Exposition in Philadelphia during March is the first step in quantity production of an automobile body molded in a single piece of reinforced plastic. Details of this body and of its production are scheduled for presentation in the April issue of MODERN PLASTICS.

Folding Convertible Tops

Automobile manufacturers are today using a protective coating sprayed over folding convertible tops for protection during shipment. This coating is stripped off before the convertible is delivered to the consumer. A possible outgrowth of this plastics application is seen in all-plastic folding convertible tops. True enough, many replacement folding convertible tops have been made, using vinyl and other plastic films. These, however, have been high in cost and have not been adequately resistant to cracking and abrasion, two factors which must be eliminated in any folding top if complete satisfaction is to be had.

One engineer feels that the public is so used to the appearance of fabric in convertible tops that any switch to plastics must take this into consideration. One approach would be to emboss a vinyl film to simulate fabric; the other approach would be to make a gradual transition so as to accustom the public to the appearance of something new. This same engineer foresees the development of folding plastic convertible tops as standard equipment, starting with a supported vinyl film and eventually turning to an unsupported film. He is convinced that within a short time a film material will be available to meet all the requirements of such convertible tops.

Even in Springs

Another possible use of reinforced plastics in tomorrow's automobile is seen in springs. Preliminary studies have shown promising possibilites of replacing the multileaf semi-elliptical rear spring with a single leaf spring formed of a reinforced plastic laminate.

Engineers in the automotive industry envision a number of additional new functional uses for plastics. Many of them are predicated on the availability of plastics materials with better physical properties than at present. Here are some of the challenges: acrylics with reduced porosity and with "case-hardened" surfaces; thermo-

sets with greater holding power for metal inserts; higher temperature resistance in both thermoplastics and thermosets; vinyls with drier surface characteristics and better cold resistance; better outdoor aging properties in cellulosics; and thermosets with more permanent dimensional stability in the presence of hydraulic brake fluids.

And here are some of the things that these engineers sincerely believe will be possible in plastics if these properties are realized—always with due regard to basic economics:

Sealed Beam Headlights

When acrylics with reduced porosity are available, glass for sealed-beam headlights will have a serious competitor. Acrylics have already been proved in tail lights, stop lights, etc. Their formability and resistance to shattering have enabled design engineers to make these units an integral part of the silhouette of many cars. This trend has been extended to a point where tail lights, for example, have, by their very shape, established themselves as "trade-marks."

Plastic windows could eliminate putty, glazier's points, assembly costs. Windows could be injection-molded in large pieces with sprayed molded-in ridges to act as "frames"

Corrosive chemicals could be shipped in injection molded 55-gal. polyethylene drums

Engineers see the future bringing the same sort of styling to the headlights. Given an acrylic (or other presently unknown transparent material with equivalent optical characteristics) which will fulfill the requirements for a sealed-beam headlight envelop, and the possibilities of restyling the front end of the automobile body become even more exciting. Gone will be the limitations of glass. No longer need lenses be round. Attention to the lens (as a lens) will be minimized and the headlights will become part of the over-all styling.

Here also are new opportunities for light control, for getting more light on the road where it is needed and less on the landscape and in the eyes of on-coming drivers. With new and virtually unlimited shapes of headlights, body designers will have fuller scope for their ideas.

How Soon Windshields?

While the National Safety Code for windshields might place temporary prohibitions on acrylic in windshields, the production of a new abrasion-resistant material or the development of a "case-hardening" process would be a boon to the plastics industry. The color possibilities of acrylic for reducing glare and solar heat transmission have hardly been explored. Given a clear plastic material with satisfactory mechanical optical properties, the glazing of the cars of the future will offer a tremendous market.

Automotive engineers talk freely about the use of thermosets in carburetor bodies, fuel pumps, and similar applications in the car of tomorrow. Corrosion resistance and low absorption are big points here. But attachment of the units presents present problems. Strength of molded-in metal inserts must be increased; alternatively is the possible developing of direct attachments with high-strength plastics.

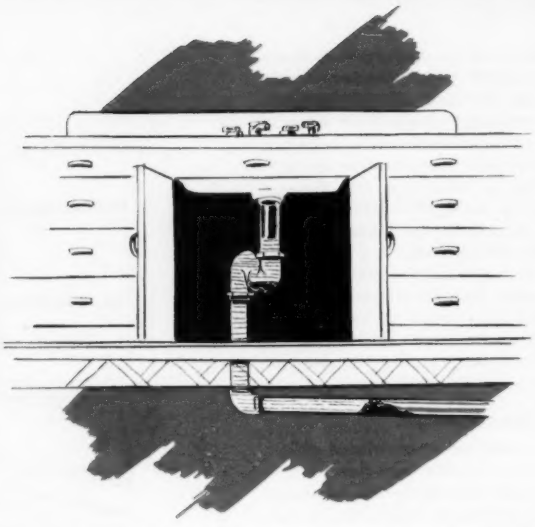
Plated Plastics

As already indicated, there is a challenging and stimulating difference of opinion on many subjects between engineers interviewed. Take, for example, electroplated

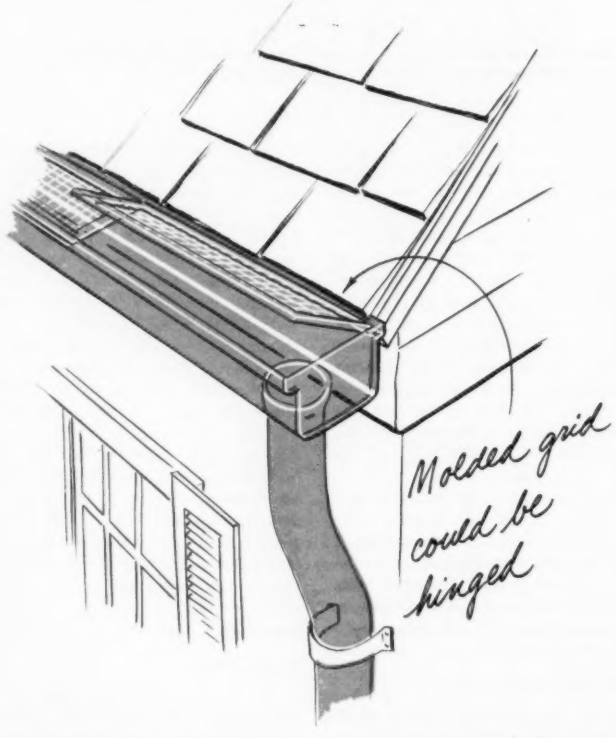
phenolics or other thermosets. One engineer cites tests on plated phenolic *vs.* plated die-cast white metal; he states that in salt spray, water immersion, and humidity tests the plated plastic outperformed the plated metal in every respect. On the same subject, another engineer said plated plastics "could be used extensively for many decorative parts if a better and more inexpensive bond could be obtained."

Despite this difference of opinion, both were firm in the conviction that plated plastics are due for a bright spot in tomorrow's car. Both cited plated plastic as a definite contender with die-cast metal in radiator grilles. The plastic will be just as handsome, probably more durable to weather, and—in the event of a bad crash—either would be wrecked!

Other possible uses for plated plastics in the future motor car include hood and other ornaments,



Plastics piping is easier to install than metal, may someday be less expensive. If such plastics pipes were transparent, stoppages could be located easily by visual inspection



Extruded plastics gutters and downspouts would be non-rusting, non-corrosive, and have integral color. Matching molded grids could keep acorns and leaves from getting in

outside door and other handles where both ends are fastened and torque is not applied to the plastic itself, and body trim where expensive, scarce metal is used today.

New Bumper Thinking

How do vinyl coated bumpers sound? Already a vinyl bumper guard of semi-pneumatic construction has been experimentally developed as an accessory, but "crystal gazing" hardheaded engineers see the car of tomorrow coming off the assembly line with bumpers guarded throughout with vinyl. Here is a possibility for plastisols.

What use, say the engineers, is expensive chromium plate on bumpers where it is exposed to constant punishment? Why not use a vinyl coating combined with pneumatic or semi-pneumatic vinyl pads at normal shock points? Here is another color possibility for the stylists. Blend the color of the bumpers with that of the body, or present an interesting color contrast. At the same time, give adequate protection to the base metal of the bumper, with the possibility of shock absorption through proper design. Vinyl could do it.

Bigger Nylon Gears

Nylon has proved itself in a number of small gear and bearing applications and has entered the automo-

tive field in speedometer gears and radio antenna operating equipment. Where will it go in the future? As one engineer puts it, it can go almost anywhere—but, again, its progress will require a change in thinking. Gear designers today think in terms of close tolerances, of rigid metals with a minimum of resilience. Nylon is different. It is tough but it is resilient. Because of its resilience, it does not require machining to close tolerances in gears. Before the use of nylon can spread to larger gear jobs in future automobiles, it will have to be realized that the gears themselves will have to be redesigned for the material. Nylon gears cannot be counterparts of metal gears; they can do a big job in motor cars, but only when new ideas are applied.

Another automotive engineer, more conservative, has this to say regarding nylon: "A plastic with the toughness and lubricating properties of nylon, but without thermoplastic and cold flow limitations, could be used for such parts as steering knuckles and bushings."

Always keeping basic economics in mind, the automobile of the future can now be word-constructed somewhat in this manner: reinforced-plastic body; plastic glazing, headlights, and all light lenses; plastic radiator grille; plastic springs; plastic bumpers; plastic carburetor and fuel pump bodies; plastic bushings, gears, and steering knuckles; and plastics in already proved electrical equipment, trim, upholstery, and sound insulation.

APPLIANCES

In the refrigerator industry, one of the large users of plastics today, there are still opportunities for plastics applications which could consume many times the poundage of all existing applications combined.

Refrigerator interiors, which already contain many molded styrene parts, will undoubtedly make use of more and more plastics. Inner door panels could easily be molded in one large piece on large injection machines. The shelves for eggs, fruit, etc., which are now attached to the doors of many refrigerators, could even be molded as an integral part of the door liner. This would eliminate many cracks, crevices, and attachment screws—and would cut out many assembly operations.

Various plastics could be used to make wall panels with integral finish, eliminating need for paint or paper. Plastics foam insulation could be built in to the panels

Turning from the door to the interior of the refrigerator itself, there seems to be no reason why a one-piece refrigerator interior with rounded, seamless corners and molded-in shelf supports could not be injection molded or molded of reinforced plastic. One manufacturer is said to have, right now, in the experimental stage, a glass reinforced polyester food liner with integral trim frame.

One expert also predicts that integrally molded shelf supports in the one-piece plastic food liner will be provided to hold up chip-proof, rust-proof molded plastic shelves. And if plastic shelves become practical, virtually the entire interior of the refrigerator will be plastic and there will be new opportunities for the use of color and styling in refrigerator interiors.

One-Piece Refrigerators

And, as if the one-piece food liners were not big enough, one engineer points out that "there is much speculation on the possibilities of molding the entire inner and outer shell of the cabinet in one piece, using this material (glass reinforced polyester). If this can eventually be done, and be made practical, it will completely change present day refrigerator cabinet manufacturing operations and processes."

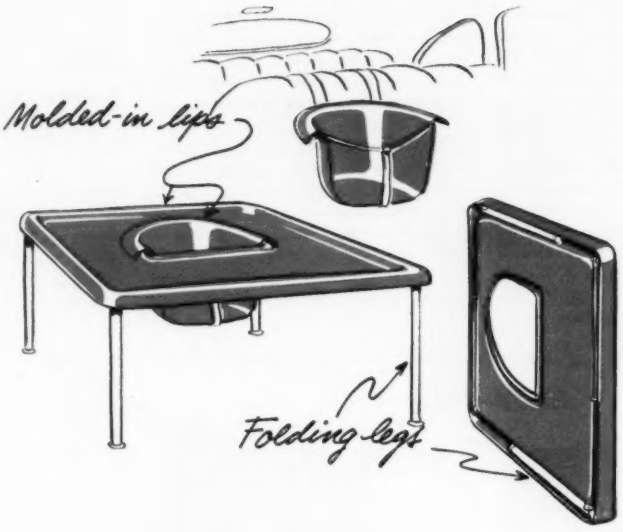
Another opportunity for plastics in refrigerators is awaiting the development of a flexible, tough, plastic film which is completely impervious to air, gas, and vapors. "If we could have a plastic film that air or gas would positively not seep through, we could make an improvement in insulation that would permit reducing the wall thickness of refrigerators and home freezers to one half or thinner. This would be accomplished by simply sealing glass wool batts in plastic bags and replacing the air in the batt with a gas such as Freon, which has a much lower thermal conductivity than air."

Pushing Porcelain Enamel Aside

In large appliances other than refrigerators, the major opportunity for plastics seems to lie in exterior housings. Most such housings are shrouds or covers rather than load-bearing structures. Thus, reinforced plastics should have more than enough strength for such applications. The sizes and shapes required for such applications can easily be

produced, but the economics of such reinforced plastics parts are not yet as competitive as they might be. The major drawback to such applications other than price is surface finish. Molders of reinforced plastics cannot as yet produce the smooth surfaces to which consumers are accustomed. When this problem is licked, reinforced polyester will be ready to push porcelain enameled steel out of the way as the material for housing for washers, ironers, and other major appliances.

Furthermore, there would be even greater opportunities for a polyester formulation with greatly increased heat resistance. Such a material could be used for stoves and heating appliances. And if that material were less moisture-absorbent, even water heater tanks could be made of it.



One-piece child's feeding table would have no dirt-catching crevices. Seat, which also is a car seat, would rest on lips molded-in edges of table to retain spilled liquids

One appliance manufacturer's engineer expresses the opinion that the plastic family with possibly the greatest immediate future is that of the epoxy resins. He says: "Being for the most part thermosetting in nature, they have two remarkable characteristics—that of exceptional adhesion and of very low moisture absorption. These characteristics . . . immediately suggest phenomenal capabilities as a priming material, used alone or modified with other resins." His company, he continues, "is currently spending thousands of dollars on facilities for applying this primer to one of its most difficult corrosion problems."

The same engineer points out that "there is much need in the appliance industry for a polystyrene of sufficient modification to have a resistance to heat continuously of perhaps 225° F. This material would find extensive use for decorative applications if its injection molding characteristics were good." He also sees a great future for the alkyds in applications where ceramic is now used—especially if the impact strength of the alkyds is improved and their cost decreased.

PACKAGING

Regarding the future of plastics in packaging, one expert says: "You can bet that we'll be seeing an all-plastic collapsible tube." Such a tube, which would be closed by heat sealing, might eventually have a cost advantage over metal foil tubes. It would also have a better feel and, because it would be softer, would be easier to use.

The same expert sees the need for a moisture vapor barrier which can easily be applied to paper on conventional coating or other existing equipment. For example, it might be possible to mix a plastic with ink so that a moisture barrier could literally be printed on the paper. Or, going even further, there is the possibility that the plastic could be incorporated in the paper while the paper is being made. It might even be added in the beater. The resultant paper or cardboard would be ideal for cartons, such as those used for soap flakes, which are now made of a paper-asphalt-paper lamination. Similarly, some simplified means might be found for applying a plastic impregnant having the effect of stiffening paperboard.

An intriguing packaging application would result if a transparent plastic material rigid enough to be used for folding cartons ever became inexpensive enough to be practical in that use. Folding cartons made of this transparent material could be printed on the inside, giving the lettering and colors a depth of appearance impossible with paper and also protecting the printing from wear and abrasion so that the package would never look shelf-weary. And think of the possibilities for window boxes. Windows of any shape or size could be produced by simply leaving a portion of the box unprinted. The resultant windows would add nothing to the cost of the box—and would be as strong as any other part of the box.

The same technique of printing on the back of a transparent plastic to get lettering with a depth of appearance and protection from wear could also be used to make labels. The material would have to be flexible and economical—and there would have to be a suitable adhesive to hold it in place on bottle, jar, or box.

Packaging Chemicals

In the field of packaging chemicals, particularly liquid chemicals, the great need, according to one expert, is for better linings for 55-gal. steel drums. Because of the lack of completely satisfactory linings, many chemicals now have to be shipped in stainless steel drums which cost between $50 and $80 each (the ordinary drum costs about $4). When

asked whether an all-plastic drum might not be the answer, this expert expressed doubt as to such a drum being made in the foreseeable future.

But others are more optimistic. A blow-molded 13-gal. polyethylene carboy is already being produced. Why not a blow-molded 55-gal. container? Nor is it necessary to wait for the blow molders to produce a container of that size. It might be possible to injection mold one with a separate molded lid which could be screwed on and tightened with some sort of wrench arrangement. Another possibility would be a lid which would be flame welded to the drum. Either type of lid could have a molded-in threaded opening to accommodate the nut type closure frequently used in 55-gal. drums.

Such a drum molded of polyethylene would have the necessary chemical resistance and, with sufficient wall section and molded-in strengthening ribs, would have the necessary strength. The requirements, according to one packaging expert, are that the drum must carry about 400 lb. of liquid and must withstand such abuse as being dropped, loaded, from the tailgate of a truck to a concrete floor. Another possible material might be saran. It is used instead of stainless steel in pipe form to convey chemicals—why not in drum form?

ARCHITECTURE

Plastics have many qualities which appeal to architects. They are rust-proof and corrosion-proof. They have integral color or finish which cannot chip or peel. They need no refinishing and are easy to clean. They can be made transparent. But plastics have found comparatively few applications in building to date.

One of the reasons is that plastics products must be produced in quantity in order to be economical—and only the few standardized items which go into a building can be made in sufficient volume. Windows, for example, are pretty well standardized and, partially for that reason, one of the greatest opportunities for plastics in the field of architecture is in glazing.

Windows a Big Market

Glazing in itself is hardly a future application, or even a new application, of plastics. Acrylic is being used for windows and skylights today, and translucent as well as transparent reinforced polyester sheet materials are finding wide markets. But all of this is only a drop in the bucket compared to the potential which exists.

One architect is convinced that with a lower price (which may soon be possible with acrylic sheet produced by extrusion instead of casting), acrylic could give window and plate glass a run for their money.

But the real possibility does not lie in a simple substitution of flat sheets of plastic for flat sheets of glass in a conventional woodframed window held in place with putty, glazier's points, brads, and what have you. Plastics can be molded and that advantage can be utilized.

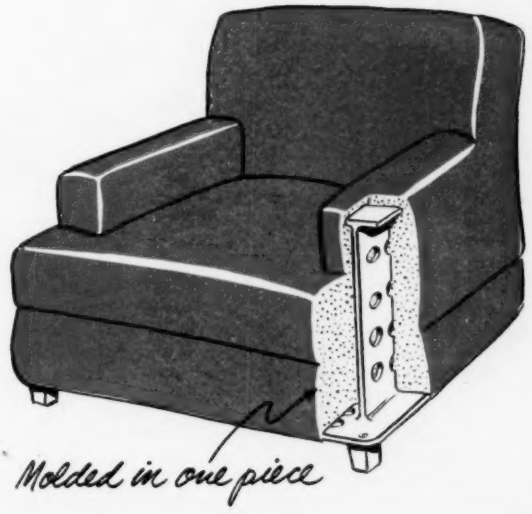
It is significant that a number of architects interviewed separately came up with the same suggestion for the use of transparent plastics in windows designed around plastics rather than the simple substitution of plastics for glass. Think, for a moment, of the way transparent plastics are used in many television sets to mold a single piece which serves not only as a window over the screen but also as an escutcheon to frame the screen.

If that can be done, why not a one-piece plastic window in which the "pane" is the flat portion and the "frame" is a molded-in rib? The rib-frame could be left transparent like the rest of the window or, as in television escutcheons, could be spray-painted to make it opaque.

Plumbing Possibilities

Plumbing fixtures are also pretty well standardized and many of them could be injection molded on the large machines now installed in many molding plants. Experimental work has already shown that wash basins and toilet bowls could be molded of styrene or some other thermoplastic. Bathtubs and shower stalls could be molded of reinforced plastics—especially, again, if the finish on such materials could be improved so as to make them more acceptable to consumers who are used to porcelain. Such fixtures would be light in weight, low in cost, easy to install, chip-proof, and with interesting color possibilities.

And while on the subject of plumbing, plastics piping should be mentioned. Pipe now being made of any of a number of thermoplastics could be used for cold water piping and waste lines today. With a little improvement in heat resistance, such pipes could even be used in home hot water systems. If such pipe were made transparent, stoppages or other troubles could be lo-



"Overstuffed" chair could be made with foam vinyl molded over metal frame insert. Skin of the foam would be the upholstery, could even have fabric-like texture molded-in

cated and the cause diagnosed by visual inspection. This would simplify life for many homeowners when sink drains stop draining.

Similarly, the transparency of plastics could be used in gutters and leaders. These could be extruded of transparent plastic so that the homeowner could tell by visual inspection from the ground whether and when the gutters need cleaning. Such gutters would of course be lighter than metal and would be rust-proof. They might even be provided with a snap-on or hinged molded plastic grid to cover them and allow the water to drain through while keeping out twigs, leaves, acorns, and other trash which tends to clog the gutters.

Wall Panels

Another building application which is sufficiently standardized to make the economies of mass production available is interior wall panels. Many architects are intrigued by the possibilities of plastics panels with integral finish. One architect suggests that such panels could be made of honeycomb construction with a melamine laminate face. Another suggests a vinyl sheet material for the surface.

A third architect suggests that the panels could be designed so that the required insulation could be built in, perhaps in the form of a plastic foam material. He points out that such a panel would combine in one piece what now requires three: the insulation, the structural wall, and the finish. He also points out that the same material, with the finished face perforated, would make an excellent acoustical ceiling.

Another suggestion on the subject of wall panels is the use of translucent plastic panels, built on the same module, which could be interspersed with the opaque panels and back-lighted as a source of illumination for the room.

As a matter of fact, almost any non-load-bearing building item now available as a standard item might well be considered as a possible application for plastics. Take overhead garage doors, for example. Why could they not be molded of a reinforced plastic? By incorporating ribs, the necessary strength could easily be achieved with only a fraction of the weight of wooden doors. The color, of course, would be molded-in and no refinishing or repainting would ever be necessary.

Low-cost metal chairs and bridge tables, which now have vinyl covering over padding, could have more comfortable lower-cost seats and backs made of sprayed-on vinyl foam

FURNITURE

In the furniture field, the one-piece molded laminate sink top recently introduced by one manufacturer is hailed by many designers as an interesting indication of things to come. As one designer points out, the laminates are wonderful materials, but their advantages are often lost because edges and joints prove difficult to handle. The future should undoubtedly bring many more molded laminate table tops, counters, bars, and specialized pieces of furniture needing rounded corners, lips, or other special shapes.

A sink top already mentioned is actually a revolutionary item because it reverses the usual principles of furniture design. Shapes are usually determined by materials and the functions must fit themselves to those shapes. When a piece of furniture is molded, the shape can be determined by the function and the material can be made to conform.

The applications of molded furniture are infinite and the materials used can be molded decorative laminates, reinforced plastics, thermosetting plastics, or thermoplastics. One specialized possibility is a child's feeding table. Such a table could have a molded-in lip on the outside edge to prevent spilled liquids from running off onto the floor —and a similar lip around the center hole in which the child sits to prevent the liquids from running into the child's lap.

Molded Vinyl Chairs

Furniture designers are also much interested in the innumerable possibilities of a vinyl foam material which can be molded to shape. Such a material could be used to make cushions and padding for chairs. Going one step further, it is conceivable that such a material could be molded in such a manner that its outside skin would be sufficiently uniform and sufficiently attractive to be the upholstery. And if that can be done, why not molded-in to that surface the same sort of effects which are now being achieved by embossing vinyl sheet materials?

It is even conceivable, suggests one furniture designer, that a one-

piece foam vinyl chair with integrally molded "upholstery" could be molded around a steel frame. Such a chair would have no stitches, no seams, no springs, and there would be no long assembly process in its manufacture.

If this is a little extreme, why not a vinyl upholstery material with an integral vinyl foam padding? Or, for low-cost metal folding chairs and bridge tables, why not vinyl foam sprayed-on to the seats and backs of the chairs and also onto the tops of the tables?

OTHER FIELDS

The fields mentioned above are only a few of the many in which plastics applications tomorrow and the day after tomorrow will make today's applications look as primitive as a Zulu's spear looks to the pilot of a B-36. There are many other fields—and many other possible applications of plastics.

In Agriculture

Even in fields where plastics are of no importance whatever today, there are potential applications which stagger the imagination. For example, an agricultural application of plastic to soil conditioning and erosion prevention was announced late in 1951 and probably will be commercially available in 1953.

Other possibilities for plastics in agriculture include a plastic which could be worked into the ground, rolled, and allowed to cure in the hot sun to turn ordinary ground or muddy land into a hard, smooth barnyard, lane, or road. Another application now in the experimental stage is a spray which can be used to protect seedlings from cold snaps, or to protect evergreens from winter damage.

There is also the possibility of a plastic coating which could be put on seeds before sowing to retard germination. By putting different thicknesses of such a coating on different batches of seed, a farmer would be able to do all his sowing at one time—but harvest his crops in phases.

These—and more—are the plastics applications in the field of agriculture, where plastics are relatively unknown and unthought of. What more must be going on in the fields where plastics are now being used in quantity and where experts on plastics are available to work out the problems as they come up!

One-piece molded plastic body for pedal-powered auto would have integral color, would be rust-proof and dent-proof. Reinforced plastic body for daddy's car may come later

Still More Toys

In the toy field, for example, it is safe to assume that the future possible applications of plastics are almost as many as in all other fields combined. As one expert points out, "the toy field mirrors the adult world, so it is safe to assume that nine out of ten things which are made for adults to use will be made in toy form too."

And in some fields, the toy application will come before the adult counterpart. It is almost inevitable, for example, that a one-piece reinforced plastic automobile body will be in production for pedal-driven cars before it is practical for large-scale use on full-size automobiles.

Foam vinyl, too, may find applications in the toy field soon. A moldable foam may soon be used to make a one-piece "stuffing" for teddy bears and other plush toys. Such a one-piece inside would give the toy a better feel, would not get lumpy, would not gather dust, would not be harmed by a ducking in the bathtub, and would greatly simplify the manufacturing process.

Progress in Decoration

In case after case, plastics components applications and markets for plastics items have been limited by present limits of decorative science.

When vinyl film was available only in clear and translucent form, its markets were limited to rainwear, industrial protection, and shower curtains. When improved pigmentation made possible colored and metallic vinyls, those markets expanded and a portion of the drapery field was added. But when color printing on vinyl became general, the film market quadrupled in a period of weeks. Then came embossing, with further market addition.

In the same way, melamine tableware is due for a tremendous market expansion with the use of molded-in color decoration, to enable this fine product to compete in appearance with the finest china.

From teddy bears to automobiles, from rain gutters to coatings for seeds, from 55-gal. drums to wall panels, the possibilities are infinite for Plastics Futures.

Plastics Futures

MATERIALS MEN PREDICT...

When gazing into the crystal ball of Plastics Futures, plastics materials makers find it difficult to separate expansion of present applications from the possibilities of new uses for plastics tomorrow. The accompanying article is based on interviews, telephone conversations, and correspondence with development men connected with plastics materials makers. Of necessity, many of the predictions sound familiar; they are founded frequently on already announced applications which, for one reason or another, have not materialized in full-scale production, or are just getting started. As a whole, they give a broad picture of the future possibilities of plastics, a picture boldly colored with imagination backed by sound judgment. This view of the future was made possible only through the full cooperation of the "contributing editors" listed on p. 259.

PROGNOSTICATING about products that will some day be made from plastics is fun but sometimes dangerous unless tempered by knowledge, judgement, and plain horse sense. There has been much premature speculation on such things as all-plastic houses, automobiles, airplanes, bath tubs, shoes, men's suits, and other possible mass-consumed articles. Speculation on such things was so rife early in the 1940's that one disgusted authority in the industry said: "Sure—we're going to make a plastic battleship that will let a torpedo go clean through both sides, then immediately self-seal the holes on each side of the hull and go merrily on its business without delay."

The amazing thing is that eventually many of these speculations may become true; during the development period, however, many people who do not realize the long time element frequently involved find that their enthusiasm has been killed off; as a result, the job of rekindling their flame of expectancy is doubly difficult.

Dreams and Nightmares

In addition, obsolescence and new techniques grow so rapidly that today's pleasant dreams can become nightmares tomorrow; contrariwise, an apparently insignificant thought today can give rise to a nation-wide sensation a year hence. The very nature and variety of the plastics industry contributes to this uncertainty. Plastics have become serious competitors within their own family. A great number of products may be manufactured from various types of plastics, and the winner will always be the one which does the best job at the lowest cost.

Plastics pipe is a splendid example. Within a very few years pipe is expected to be at least among the five leading outlets for plastics. It runs almost the complete gamut of plastics materials. Cellulose acetate butyrate pipe is already in bigger volume than generally recognized. It is moving into the oil fields almost as fast as it can be made, but has barely scratched the surface in this field alone. Public utilities have been testing it for years in soils where acid conditions are prevalent. This use may easily spread to include gas lead-in pipe and all sorts of utility applications. Polyethylene pipe has already moved into mines where it could well take over the entire field because metal pipe corrodes so rapidly. Adhesive coated polyethylene strip wrapped around metal pipe is also a plastic competitor in the oil field and utilities pipe market.

"Today's pleasant dreams can become nightmares tomorrow; contrariwise, an apparently insignificant thought today can give rise to a nation-wide sensation a year hence."

Rigid and elastomeric vinyl, polyethylene, saran, and phenolic pipe have already made successful debuts in chemical, paper, textile, and other plants where metal pipes were subject to corrosive action that required frequent replacement.

Plastic pipe or tubing—of cellulosics, polyethylene, and vinyl—is only in its infancy for irrigation purposes. Such pipe could not only replace present systems, but, because of low cost and ease in handling, together with synthetic ion exchange resins that may some day make brackish water usable, could help to make thousands of marginal acres blossom with roses, wheat, or what-have-you.

Just Beginning

Farmers in general have not even begun to use plastic pipe to its full possibilities. Piping water from windmill or other pumps to various tanks about the farm, laying it on the ground for temporary watering installations, and constructing overhead water sprinklers for use in times of drought will eventually require thousands of miles of plastics pipe.

A fantastic look at the far future even suggests that a heat resistant plastic pipe may be used to pipe heat from the bowels of the earth to heat homes and other buildings. Pipe embedded in walls and flooring for a radiant heating system has already been tested; flexible pipe lines for water and gas in a house so that rooms might be rearranged without tearing up the walls may some day be devised.

Keen Competition

Polyester, styrene copolymer, and resin glued plywood pipe are still comparatively new, but will eventually offer keen competition in most of the above fields. Even oil resist-

ant styrene copolymers are being developed for the petroleum fields as well as copolymers that will have low temperature impact resistance. Polyester-glass pipe offers high impact and chemical resistance that fits nearly all piping needs just as soon as cost comes down; and that seems to be only a matter of time. U. S. Navy and Engineer Corps researchers seem convinced that polyester pipe offers outstanding possibilities for shipboard and open field use because of its light weight and corrosion resistance.

The above activity in pipe has grown during the past few years largely because plastics materials companies and processors have spent thousands of dollars and uncounted man hours in research. The chemical industry is certainly an outstanding, if not the leading, exponent of research activity. Each raw materials producer employs technically trained men with sales sense who track down and help to develop end uses for their product. They call this work "applied research" as distinct from pure technical research. When more of the plastics processors engage such sales promotion, products of high quality will multiply by the score.

Batteries Tomorrow

An example of what can happen as the result of this type of work is found in the program now being carried on in the battery industry. Approximately 27 million replacement batteries are required yearly by the automotive industry; 3 million replacement batteries are required by communications, railroad, and other industries each year. End-use sales personnel accumulated data showing specifications to which plastics must conform in order to replace the materials used in battery cases. It was found that the communications industry was using many glass battery jars in which there was not only a high percentage of breakage, but also a production spoilage of 7 out of ten. It was found that polystyrene could replace not only the glass jar but also many hard rubber containers in this field.

As yet, plastics can still look forward to the largest market in the battery field; that of the automotive industry. When this application is won over, it will require at least 60 million lb. of material annually.

In addition to battery cases, plastics will find other uses in this field. For example, a separator plate of styrene copolymer has already been devised; the time may soon come when every storage battery is thus equipped. Battery separators made from glass fiber bonded with phenolic or polyesters are also in production, but the market has by no means been saturated.

Another example of applied research is that of the manufacturer of an automatic pencil who was told the job he wanted could not be molded. So he did it himself in his own plant at a rate of a million a month with polystyrene. That tale is reminiscent of the tall Scottish mechanic who was put to work on the job of devising a gasket for submarine periscopes. He finally molded one from plastics. Said the Scot: "I was too dumb to know it couldn't be done, so I done it."

Possible Impossibilities

All of which shows that in plastics the impossible is often possible. Impossible as some products may seem now, someone may come along with the material and engineering required to produce them. The important thing is to distinguish between a gleam in the eye and the real thing, proved and ready to go. Applied research is the answer. Processors, of course, cannot ignore the aspect of cost in the manufacture of an article, but they must maintain quality as well.

Obviously, specialized plastics, developed for particular uses and which would improve existing products, cannot usually sell for the same price as the lowest cost plastics. Cost is not the only selling tool needed. The steel industry, for example, does not have a transparent, crystal clear material or a steel suitable for every use; rather, it has highly specialized alloy steels, all developed with specific needs in mind. The alloys cost more—but they broaden the market. New products coming in plastics will depend upon the ingenuity of the engineers to blend cost, quality, and usability into a satisfactory product that the customer will want to buy.

Better Materials

Certain broad improvements are discernible in materials. There will be a continued push against present limitations in heat resistance, chemical resistance, weather resistance, and electrical qualities. Developments are being fostered by current military investigations and will probably involve wider plastics uses of those resins which are now considered merely fiber formers—polyamide (nylon), acrylonitrile, and terephthalic acid polymers. There will be continued progress toward the breakdown of the gap between ceramics and plastics, which has already been narrowed by the silicon and fluorine derivatives, with the boron and nitrogen derivatives coming forward.

A breakdown of coming new products by materials must necessarily be interrelated because of interplastic competition. Here is how our "contributing editors" see it.

ACRYLICS

There is almost certain to be an increase in acrylics in automotive uses. A great portion will be in the broadening of present applications, but there is expected to be a trend toward the use of metallized acrylic as a replacement for chrome in decorative trim. An example would be acrylic tail light lenses with surrounding bezels in metallized acrylic

"There is expected to be a trend toward the use of metallized acrylic as a replacement for chrome in decorative trim . . . Simulated chrome is only one of the many possibilities."

to simulate chrome. This use could well be extended to chrome trim in other fields, including plumbing faucets and drawer pulls. Simulated chrome is only one of many possibilities.

Because of weather and breakage resistance, acrylic uses will expand in both street and industrial lighting.

Housing Installations

Injection molded windows are described in some detail on page 125. The light weight and strength of such an acrylic window could lead to snap-in, puttyless installation systems. Injection molded panels in color for facings on building exteriors is a possibility. Molded 20-in.

square acrylic panels in ceiling areas suggests wider application of even larger molded pieces for lighting areas.

Continuous production of acrylic sheeting by extrusion is almost certain to increase the uses of the material. Acrylic glazing with cast sheet has become almost standard in England. If cost can be reduced by extrusion, it will have much wider adoption for skylights and other industrial applications in the U. S.

Tremendous expansion of helicopter production will also call for far more acrylics than have ever been used in aircraft to date.

If and when cost of acrylic is reduced a substantial amount, it will move rapidly into competition with lower cost materials, especially in the electrical appliance field.

STYRENE

There seems to be less inclination to talk about the future of styrene products than any other large volume plastics material. Strangely enough, that is probably an omen of many new products in the offing. Engineers don't like to talk about a product they are about ready to spring for fear the competition will hear about it. Die makers are reportedly busily engaged in producing a great number of molds for large pieces that are definitely headed for big injection presses. The years 1952 and '53 could be momentous milestones in the polystyrene march toward ever greater volume.

The combination of decorative and functional characteristics of polystyrene has created interest in fields not yet deeply penetrated, such as automotive, architectural, building equipment, plumbing fixtures, pipe, office equipment, furniture, textiles, processing equipment, vending machines, and musical instruments.

Shingles, siding, down spouts, guttering, and storm window frames all will be possible if and when the weather-resistance of the material is improved. Additional developments will be along the lines of such diversified applications as outdoor display and furniture components.

Housings and Hardware

Among the items mentioned in the trade for which dies are being considered are such things as carrying cases and housings for all sorts of things—bathroom hardware, display signs, filing cases, medicine cabinets, certain types of chairs, and more and bigger parts for refrigerator interiors.

One correspondent reports that no radically new products will be developed until fabricators can actually demonstrate lower costs or better performance in specific applications of materials—whether plastics, glass, wood, or anything else. Just something new in plastics no longer has sales appeal. He says that fabricators must prove financial solidness and sound sales policies, must engage in more product research, and must give greater attention to problems of distribution.

"Every producer (of polystyrene) is working to improve his product. Higher impact, less static attraction, higher flame- and heat-resistant materials are all on the way."

Every producer is working to improve his product. Higher impact, less static attraction, higher flame- and heat-resistant materials are all on the way to broaden the base of possible styrene products. Copolymers which have better properties are still only a small part of styrene production, but it is these same copolymers that give higher impact resistance which are going to lend added impetus to the large molded piece program; to plastic pipe development; to molded parts for replacing brass and copper; and to molded textile machine parts.

A polystyrene-glass material of extremely high impact strength is also a competitor in this field. It will be used for pipe, toys, tote boxes, luggage, and industrial applications.

Copolymer Sheet

Styrene copolymers modified with synthetic rubbers of both nitrile and GR-S types have already made quite a dent in the sheeting field and will go much further. They will compete strongly in the housings field for such things as typewriter cases, filing cabinets, storage racks, children's wheeled vehicles, and structural parts, such as partitions, telephone booths, and perhaps decorative wall board. Large volume use is expected in ducts for industrial plants where toughness, light weight, and resistance to chemicals make it a logical successor to metal. Army relief maps by the thousands may also be produced from this versatile material and it is quite possible that this same sheeting will eventually be used for body panels in station wagons.

Copolymer sheet can be vacuum formed on equipment that will deliver a 26-in. vacuum; slip formed on a press equipped with a lower or "cushion" cylinder at 5 to 10 lb. p.s.i.; formed over dies of wood, Masonite, or like material. Its possibilities have so far been studied by only a few fabricators. Future growth depends upon more widespread adoption by more processors.

This same type of modified styrene copolymer can also be expanded into foam or sponge type material that may become an invaluable thermal insulator for refrigeration, buildings, and packaging.

With Butadiene

Close kin to styrene copolymer molding powder and sheeting are the high-styrene butadiene compounds containing anywhere from 60 to 85% styrene monomer. These resins in granule form are used to extend rubber in floor coverings; in shoe soles; in latices used in paint and paper coatings; and possibly in finishes on wood laminates. They are generally combined with synthetic rubber. One formulation is expected to be much more widely used in football helmets and other athletic goods. It may also be formed in sheet, then laminated for such structural purposes as telephone booths.

Largest use of this resin to date is in shoe soles where, together with other synthetics, it has reduced the leather take of the market to 42% as compared to 78% in 1942. One company has expanded capacity for this type of shoe sole 700% since 1945, and expects to bring in 40% more in 1952. Producers look forward to taking over more and more of the shoe sole market. This same material can also be made soft and leatherlike for such things as upholstery and luggage covering. One company has announced that it will soon be making this type material into uppers for men's shoes that will

be produced with a built-in ventilating system.

Used as a latex, these high-styrene butadiene resins have already created a mild revolution in the paint business as the foundation for so-called water emulsion paints that require no solvents. A new type latex that can be used for exterior as well as interior applications is expected soon. Several paint manufacturers are crediting latex paints with a general increase in sales for their whole line. These paints are also eliminating seasonal business. Paint sales used to be heavy in the spring and fall, but the new paints sell well all year 'round.

SILICONES AND FLUOROCARBONS

Because of their extreme high heat and chemical resistance, silicones and fluorocarbons should eventually become two of the most important plastics tools of industry. At present their high cost is a drawback, but there is so much activity in the field, and such great demand for these types of materials, that eventually cost is certain to be reduced. Furthermore, cost is frequently unimportant in certain applications where silicone and fluorocarbon materials cut down on maintenance costs.

Today a great portion of all silicone and fluorocarbon production is for military or government use of one type or another, but development work and some civilian production is being continued.

The most common uses today are in applications such as gaskets, packing, tubing, and insulation where high heat and chemical resistance are important. A 16-lb. fluorocarbon gasket, 0.125 in. thick, and jacketed gaskets up to 12 ft. in diameter have recently been announced.

Oils and polymers from these two materials may well furnish the basic material for fireproof mastic and sealing compounds that are very much needed throughout industry.

Smaller Motors

As insulation materials, silicones and fluorocarbons are two of the plastics that will help to reduce the size of electric motors so that smaller components can do the work of larger ones.

The traditional oil-filled electrical transformers of the power utilities may some day universally use fluorocarbons and silicones. Results will be compactness, ease of installation, and complete freedom from moisture absorption.

Replacements for copper, brass, and aluminum die castings will be made from silicones either alone or in combination with phenolic compounds. The molding industry is only waiting on this one until the resin is made a bit more easy to handle as a molding compound.

Electronic Parts

Both materials are due to get into a lot of electronic parts, since a very thin coating on wire serves to make that wire acceptable for ranges, water heaters, and electrical parts of all sorts. Use of both materials is due to expand rapidly in applications where "stickiness" is a nuisance. These include various utensils for the baking industry; rubber molds; plastics extrusion dies; wrapping machinery parts (they eliminate wax pile-up); laminating platens; slasher drums; weighing scale platforms; bearings; and conveyor chutes. A possibility not yet exploited is in extruded monofilament or threads that would be woven into fabric for such uses as filter cloth.

"Material cost is frequently unimportant in certain applications where silicone and fluorocarbon materials cut down on maintenance costs."

Silicones have already had wide acceptance as an ingredient for polishes, water resistant waxes, and automobile finishes, and it is claimed that the fluorocarbons will eventually be used for the same thing.

Good Weathering Properties

The use of silicone resins in paint or various protective coatings may soon become possible for automobiles, farm equipment, and all other applications where good weathering properties are essential. New finishes of silicone-alkyd copolymers developed for space heaters, cooking stoves, and other household appliances are easier to apply than porcelain, are marproof, and are resistant to chipping.

It is probable that the engine lubricating ability of silicone fluids will be improved to the point where it will be possible to incorporate them into permanently sealed systems that may last as long as the engine itself.

Some of the new synthetic fibers will be coated with silicone for permanent water repellancy. Upholstery and drapes thus treated would have added fire resistance. Rainwear, children's snowsuits, and even waterproofed men's suits for every-day wear may result from this development.

Better Insulation

Silicone intermediates will undoubtedly soon become available for use in dyes and pharmaceuticals. Silicone rubber is already being used for insulating the electrical systems of military equipment such as tanks or jeeps that must go through water. High heat-resistant insulation material is necessary because of the heat of the engine. It is possible that this same application may later be adopted by commercial vehicles.

Silicones and fluorocarbons are also taking an important part in the Armed Services miniaturization program because such a small amount is needed for insulation. Perhaps this usage will spread to civilian life and everybody will be able to carry an instrument like Dick Tracy's wrist radio. Vinyon N —a vinyl chloride-acetate copolymer with acrylonitrile—also looks promising in this so-called enameled wire program.

Silicone rubber is a possibility for use in heavy duty tires—possibly in side wall construction because it has unusual ozone resistance and shows little or no compression set at moderate temperatures. Experimental work today indicates that silicone rubber molds may be used for intermediate temperature casting since they are self-releasing and self-cleaning. Their flexibility would allow them to be made and used in one piece in many cases where several mold sections are necessary today.

The recent development of silanes broadens the base for silicone type resins. The new chemical will be

(*Continued on p. 217*)

Plastics Futures

Plastical Archeology

by DR. JOHAN BJORKSTEN

Progress in plastics during the 20th Century, as viewed by an archeologist from the vantage point of the year 6943 A.D.*

The following unusual paper was presented at the recent Chicago National Conference of the Society of Plastics Engineers. The author hypothetically reports, from the year 6943 A.D., as an archeologist who has specialized in the study of chemical and physical methods of early (1950-2050 A.D.) American industry.

Dr. Bjorksten, Bjorksten Research Laboratories, Chicago, Ill., was introduced on the platform by "Prof. E. L. Bookbrowser," Chairman of the Department of Archeology, Southern University of the Fifth Meridian, U.S.A., a part taken by Dr. Edwin L. Gustus, vice president of Bjorksten Research Laboratories. Prof. Bookbrowser's introduction gave the background of this particular piece of archeological research.

The 6943 records reveal that, about the end of the 21st Century, an atomic missile, so designed that it would guide itself to large city targets by making use of the higher temperatures and higher carbon dioxide content of the atmosphere over cities, was accidentally discharged from an Afghan base. Through a series of unfortunate errors, the missile landed in Chicago. The city was badly damaged, but many areas were left relatively intact.

After this occurrence, cities were abandoned. Mankind rapidly decentralized with the realization that great urban centers were obsolete, cost too much to defend, and were not pleasant places in which to live.

What was left of Chicago was the locale of Dr. Bjorksten's archeological investigations 4000 years after the disaster, when construction activities on a new transcontinental rocket tunnel fortunately turned up some artifacts in the area. He found evidence that the plastic age must have been born, developed, and reached great applicational maturity in an incredibly short space of time when compared to the metal age which preceded it.

SOME five years ago, the transcontinental rocket tunnel pierced the site of the former city of Chicago. In the interests of archeological studies of early industries and arts, the digging equipment carried apparatus for the examination of the removed material. It was my privilege to have charge of the analysis of the chart recordings of the automatic instrumental testings, and you can imagine my joy at the discoveries made there regarding the objects belonging to the earliest years of the plastic age.

Pure Polystyrene Found

Press reports have no doubt informed you of our discovery of quantities of pure polystyrene, a plastic which has not been used in this pure form industrially for several thousand years. This finding at once showed us the antiquity of the site of the tunnel.

One of the most prized discoveries was a piece of very early phenolic, "Bakelite," now the earliest known plastic article of the non-cellulosic and therefore permanent types. This priceless object has been sent to the Central Museum for Industrial History. Other examples of the phenolics of the pre-Carbide days were also discovered, and have been carefully studied for the light they shed on the dawn of the plastic age.

It had been regarded as a fundamental truism that simplicity of structure is the mark of great industrial antiquity. Thus, everyone believed that the earliest plastic must have been one of the polyethylenes because of the chemical simplicity of these materials formed, as they were, from a simple molecule merely by heat and pressure.

These finds show that the polyethylenes were preceded as much as half a century by phenolic plastics, and that acrylates, alkyds, and amine-aldehyde resins occurred earlier than the first finds of polyethylenes. The epoxy resins appeared within the following decade.

Trends of the 20th Century

Taking the broad view, we can distinguish the following main lines of events in plastics development:

The trend toward increasing size.

The trend toward increasing strength of materials.

The trend toward differentiation between structure in outer and inner layers of articles.

The trend toward differentiation between chemistry of outer and inner layers of articles.

The trend toward increasing number of polymers available.

The trend toward increasing scope of applications.

These trends all depend on each other. For example, increases in size became possible through improvements in engineering practice and equipment, as well as through increased strength of materials, and these, in turn, came about through structure differentiation and chemical development.

While the qualitative improvements took place at a fairly constant rate between 1920 and 2100, the volume of production, as we judge it from the number of specimens

*The photographs used for this article were prepared by Henry Dollard, research photographer, Bjorksten Research Laboratories, Madison, Wisconsin.

dated to any particular year, moved in sudden spurts. Such spurts occurred, for example, when, about 1970, the glass filled laminates exceeded steel in strength; when, around 1990, the fertilizer industry began to utilize its fluoride by-products for plastic production, bringing about low cost fluorinated resins, and again when the polyphenols became cheaply available from the chemurgic forest industry lignin.

Between 1930 and 1950 a number of plastics had made their appearance, including, for example, melamines, allyls, epoxies, silicones, siloxanes, fluoro-resins, methacrylates, and presumably, the less stable and therefore not preserved butene sulfones and vinyl chlorides.

Fillers Perfected

The greatest progress in mechanical properties came about as the fillers were perfected.

About 1950 the glass filled laminates apparently began to be used, mostly for relatively small items such as cabinets, boats, and military implements. The discovery of treatments to effect a moisture resistant chemical bond between filler and alkyd type plastic must have taken place about that time, for the number of applications and size of the specimens both increase dramatically during the following decades. Since these specimens contain organic resins, it is easy to date them with an accuracy of ± 5 years, by the use of refined isotope techniques.

About 1970 glass filled laminates had reached the stage where they surpassed steel in tensile strength. Rigidity of the structure was made comparable to that of steel by improvements in resin, bond, and filler, but quite particularly by ingenious design techniques.

As soon as the rigidity problem was solved, it appears that these plastics became standard in automotive and constructional parts, where weight, low cost, and freedom from corrosion were important. Bridge design was changed drastically. A steel cable 7 miles long would break from its own weight, and so the silicon and fluoro plastic protected glass cables were destined to play a key part in the deep mining techniques which came into play when the surface deposits of valuable minerals had become exhausted through the reckless exploitation of the early industrial era.

Larger Molded Pieces

Along with these refinements, the dimensions of the injection molded specimens increased at a steady rate during the 21st and 22nd Centuries. The very oldest specimens are small enough to hold in the hand. Around the middle 1950's we find considerable furniture and cabinets made by injection molding. Around 1970 the use of house components such as reinforced beams, wall panels, etc., become frequent.

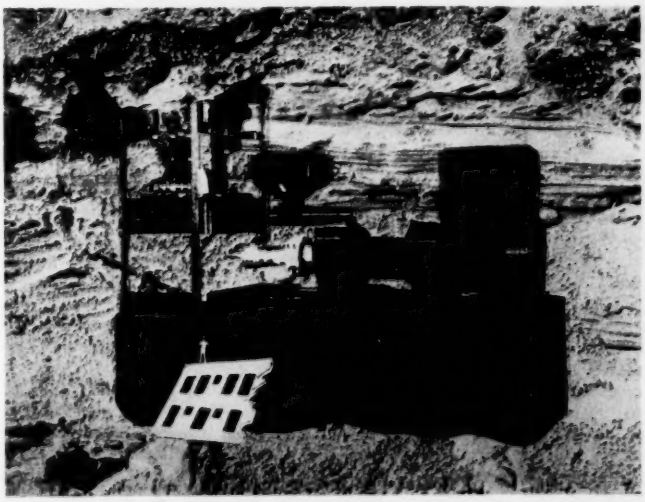
The application of extrusion techniques for filled materials is illustrated by a traffic tunnel which was severed in the catastrophe Prof. Bookbrowser referred to. As we uncovered the opening, the cars in the tunnel, and the remains of their occupants, were recovered. This traffic tube was made by extrusion of a mildly crosslinked polyethylene, using carbon black and glass fiber as fillers, to the extent of 45% of the total weight.

Injection Molded Houses

Housing was a basic requirement of the human race then, as it is now, and it was but natural that the newly acquired skill in the making and handling of plastic, should be turned to this basic need. The work on extrusion and on injection molding of components had paved the way, and by 2028 we find the first house which had been injection molded in its entirety. Reinforcement gave strength, foaming gave insulation, and by combining the two with a mass production technique, it was now possible to produce better housing than the average man had ever known before, in 2 or 3 operations and using very few tons of plastic.

In the upper strata of Chicago, say corresponding to 2050 till 2150, we find predominantly three types of house structure. The low cost housing was made by extrusion as tubing, and then caused to sag along two seams by the application of heat rods to the floor, so as to produce a semi-tubular structure. In the medium range, injection molded housing made from glass or polyamid fiber reinforced polystyrene copolymers permitted rapid production and at the same time conformance with traditional house forms, to which the population seemed to cling from tradition, long after any engineering reason for these particular construction forms had ceased to exist.

Glass laminates from styrene-alkyd, fluoramide, or epoxy resins were more adapted to individual



Excavation in year 6943 A.D. uncovered injection machine, used in year 2028 to mold entire wall for a 2-story house in one reinforced piece. Foam insulation was used

custom design, and were found in the luxury housing.

In the low cost structures, the main body of the housing was made by extruding a transparent plastic of hydrocarbon type. This plastic was then exposed to flash heat from the inside, which caused the volatile constituents present in the extrusion mix to boil, so as to create a foam structure in the inside part of the wall, while the outside layer remained a hard skin. The building was then spray painted on the inside with a highly resistant polyphenol type finish, carrying the desired pigments. For windows, the original clear plastic was preserved in the desired window areas, simply by applying masks of insulating tape, which reflected the heat applied in the foaming step and masked off the paint spray. Molded side walls were used to seal off the ends of the tubular structures.

The only portions of the houses which were not molded in the single operation were radiant heating arrangements. Subsequent to about the year 2000, the most frequently encountered heating arrangement was a ceiling structure composed of a tubular arrangement of polyfluorohydrocarbon copolymers. These plastics offered a possibility of circulating heated water at temperatures where many other plastics would suffer from creep, and at the same time comprised perforated members, acting as acoustical ceiling, and permitting air flow for ventilating purposes.

Archeologist in 70th Century discovered vehicular tunnel destroyed at end of 21st Century. Tunnel was extruded of polyethylene with carbon black and glass fiber fillers

Plastics and Fertilizers

The fluorinated materials were scarcely in evidence until 1980, when they suddenly appear on a substantial scale, particularly in airplane and vehicle parts, where some high temperature resistance together with increased mechanical strength appeared desirable. Based on correlation with studies elsewhere, it is our belief that the appearance of the fluorinated plastics on a large scale coincided with the adoption of methods for economical recovery of fluorine from superphosphate fertilizer production, where it had previously gone to waste.

As large markets appeared for the fluorine products of superphosphate fertilizer industry, the firms manufacturing fertilizers began to buy heavily into the plastics field. They had already become familiar with this field from another standpoint, inasmuch as the commercial use of resinous polyelectrolytes, essential today in all farm soil treatments, dates back to the 1950's.

Research sponsored by the fertilizer companies brought about the utilization of both silicone and fluorine by direct reactions involving silico-fluorides. Thus were created the "siloflor" resins, and a new path of effort was found. These developments finally led to the polysiloflorinol amides, which became the basis for the "eternity paints" so well known to archeologists working with artifacts from later than the 24th century.

In addition to the large objects mentioned, we found a great number of smaller artifacts, which shed a good deal of light on the daily life in those remote days. The object of some of them, however, remains obscure. For example, we found what appears to be a fragment of a net, which I believe may have been used for harvesting algae or plankton in the adjacent lake, in an effort to supply increasing food requirements of the city. However, some of my colleagues connect this net fragment with a crude cellulose base print, found imbedded in plastic at the Chicago site. (See nylon mesh photomicrograph and nylon application photo herewith.)

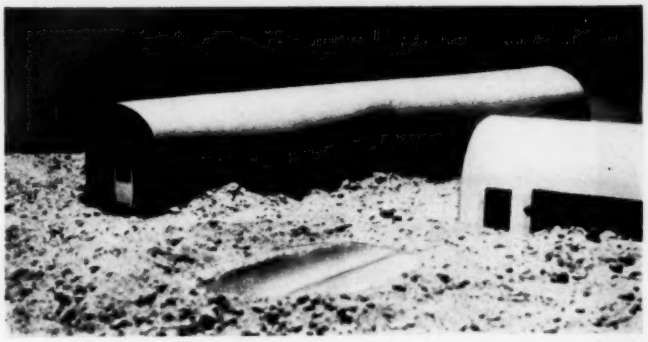
Vinyls Then and Now

There is a good deal of evidence that the vinyl chloride, as well as the still lower priced butene-sulfon resins, already enjoyed considerable popularity at this time. However, these low cost resins were not at that time stabilized to the point of endurance through millennia, and therefore we do not have samples preserved from those early days. The chlorine content of dust in the interior of many habitations might indicate, however, that vinyl or vinylidene chloride, or their copolymers, were already then employed in draperies and household articles, as they are now.

While the phenolic resins had increased in occurrence all along on a quantitative basis, their occurrence as a percentage of all resins had been receding, due to the spectacular increase in the use of thermoplastic resins in the 20th and 21st centuries. This trend was accelerated by the perfection of crosslinking agents for thermoplastics, which could be activated after molding either by curing or by chemical diffusion, or radiation. In this manner, the materials could be ex-

truded or injection molded as thermoplastics, but could then be caused to crosslink, so as to acquire the heat distortion resistance of the thermosetting resins.

The comeback of the thermosetting materials did not materialize until the end of the 21st century, when we find a larger percentage of samples of phenol based plastics, this time based on polyphenols such as resorcinol, pyrogallol, and their isomers. A detailed analysis of the impurities present in these resins leads us to conclude that they were prepared from lignin, and indeed, their prevalence in the next centuries follows closely the expansion and contraction of the chemurgical forest industry.



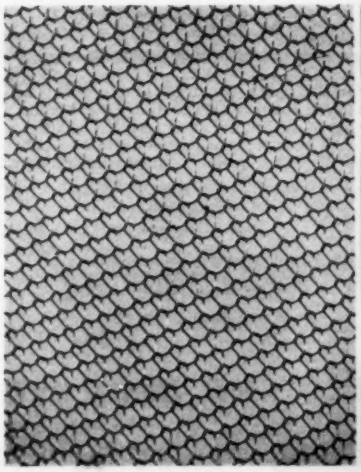
Low cost housing made between 2050 and 2150 A.D. was made by extrusion of tubing which was then caused to sag along two seams by applying heat rods to the floor

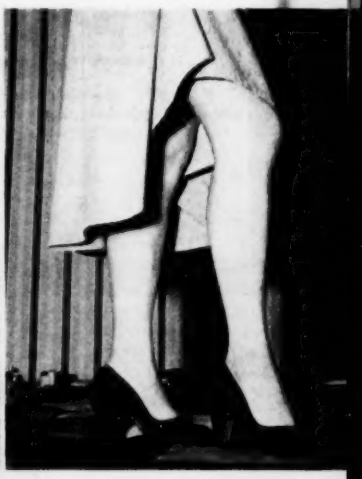
Contradictory Requirements

In studying the smaller injection molded artifacts, we soon found it possible to date them without resort to the tedious isotope technique, merely by study of the mechanical structure. The oldest specimens, say up to 1955 or so, were usually uniform throughout; even the color was evenly dispersed throughout the mass. As the size of the articles increased, greater differentiation in structure becomes a mechanical and an economic necessity. Color is imparted by surface coatings, which fuse with the plastic to a unitary body, which cannot be parted by mechanical means. The seemingly contradictory requirements of surface hardness and mar resistance, together with freedom from brittleness and high impact strength are met in three ways: by surface coating a tough inner core of inexpensive plastic such as butene sulfon, polystyrene, etc., with a fused outer layer of extremely hard and mar resistant allyl of polyphenol resin, or equivalent; or by interdiffusing a crosslinking agent from the outside, so that a hardened surface layer surrounds the more tenacious core; or achieving a similar effect by including the crosslinking agent and an inhibitor of this agent in the original molding mix, and then inactivating the inhibitor by means of a low molecular ozonide diffusing in from the surface.

When filled injection molded specimens appear, the arrangement of the filler is a good index of the advancement of the art at the time the article was made and hence permits us to date the article. The earliest artifacts show a random arrangement of the filler, and poor adhesion between filler and plastic. Subsequent to about 1950, the filler was treated to give good adhesion, with resultant improvement in strength. In the following decades, attempts became evident to achieve orientation of the reinforcing fibers. The skill of mold engineering for achieving the best distribution of reinforcement increased steadily during the following 50 years, until the advent of magnetic glass made possible the utilization of magnetic fields to achieve perfection in this regard. This "magnetic glass" was made by surface absorption of magnetic films to micron size glass, polyamide, or siloflor fibers.

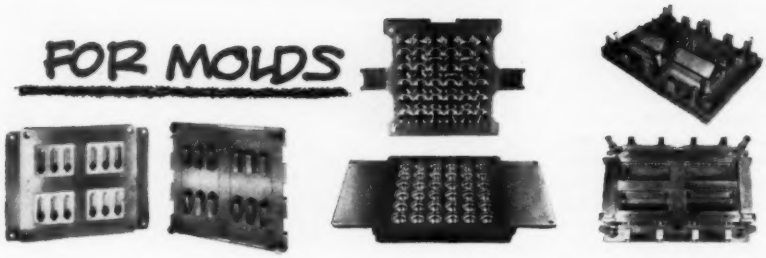
In looking back through the millennia, we must admire the ingenuity and resourcefulness of those early engineers, who in two centuries brought a new age into being, who in a spurt of creative energy unequaled earlier or later in man's history, gave us the materials, and the mastery of their use, which made possible an era of peace and plenty for all.



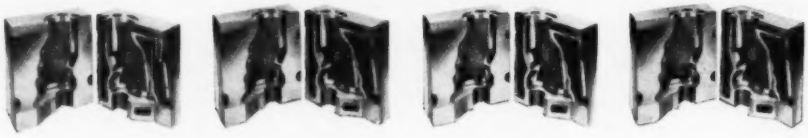


Precision mesh of polyamide substance (left) was a puzzle to 70th Century archeologists who discovered it. Prevailing opinion was that net was used for harvesting algae or plankton in lake adjacent to ancient city of Chicago. A few experts argued that there was some relation between the net and photograph (right) discovered at the same site

FOR MOLDS



FOR HOBBED CAVITIES



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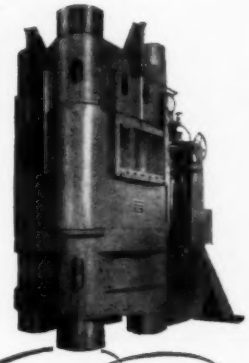

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WHAT THE ENGINEERS WANT

To obtain a view of Plastics Futures from the engineering angle, a number of typical users—rather than builders—of equipment were asked for ideas and suggestions. Past experience supplies the logic behind this approach. When larger platen areas, greater tonnages, and higher capacities have been engineered into equipment, it was because the equipment users wanted to make larger and heavier compression or injection molded parts. When specialty presses for reinforced plastics were developed and placed on the market, it was because the molders needed them. When extruder capacity was increased, when the machines were refined, and when extruder compounding was developed, the impetus came from the users of the machines. In every case it was up to the manufacturer to meet the demand or lose business to manufacturers who would. The same basic pattern of cause and effect has been repeated in all types of machinery and equipment manufactured for use in the plastics industry.

EXTRUSION

WHEN Victor Haupirch, Yardley Plastics Co., Columbus, Ohio, stated that extrusion machines as currently offered on the market are quite well suited and designed for their job, he had some reservations in mind. He continued: "We would like to see all machines include a direct reading tachometer to show screw r.p.m. In addition, it would be well to have a meter connected in such a manner as to indicate any rise in the electrical load due to cold material, a dirty screen pack, restricted die orifice, or any other difficulty which if not immediately corrected would lead to broken or damaged equipment."

Some of today's machines are equipped with a swing type of gate designed to facilitate quick die and screen changes. However, in a production setup using repossessed material, screen changes often become necessary, and even with a swing gate the machine must be completely shut down. Mr. Haupirch suggests the use of a double orifice adaptor which would permit closing off material flow at either orifice while making the screen change on the other, thus eliminating the need for shutting down the machine and starting up again after the screen had been changed.

Temperature Control

He would also like to see more positive and accurate temperature control instruments for the extruder barrels. He states that, while many good instruments are on the market, it is generally felt that, despite their complexity, they still do not adequately handle the over-shoot and lag in material temperature. A large manufacturer of extruding machines admits that the closest control of material temperature which he knows of to date is no closer than plus or minus 10°F. This admission is certainly proof positive that much work is still to be done on temperature control equipment.

Mr. Haupirch further states that servicing on present temperature control instruments is far from adequate, perhaps because they are so complicated and because coordinated information on adjustment and repair is not generally available. His experience is that these instruments frequently go out of whack; when they do, the extruder must be taken out of production until the difficulty has been overcome. As he puts it, "nothing makes a machine quite so useless as an improperly functioning heating system; and in most cases a good instrument man is hard to find when the production line is stopped for lack of heat control." He suggests that perhaps a power rheostat would give more positive and trouble-free temperature control.

There are several types of instruments available to the film and sheet industry with which the thickness of the sheet being produced can be continuously checked. These instruments do not make physical contact with the sheet, and therefore do not interfere with continuous production, whether it be by extrusion or calendering.

Wall Thickness Gages

Producers of tubing or pipe, however, are not so fortunate. When flexible tubing or pipe is being extruded in long lengths and when wall thickness tolerances are close, it is impossible to determine the wall thickness in any one spot in the length, other than at the beginning or end. Mr. Haupirch feels that it would be highly desirable to have some sort of indicating instrument, similar to that now in use by the film and sheet producers, which would continuously indicate the wall thicknesses of a tube as it is being extruded. He states that such an in-

* Reg. U. S. Pat. Office

Plastics Futures

Extruders of tubing would like to be able to measure wall thickness without cutting the tube, just as existing instruments can continuously check sheet thickness as extruded

strument would be a tremendous help in effecting huge savings in scrap, as well as giving the end user a more uniform product.

Thin Film

Many manufacturers of thin vinyl film would like to produce a film suitable for use in food packaging. The prime requisite to this end is a completely non-toxic vinyl material. According to Willard Crater, Jr., Naugatuck Chemical Div., U.S. Rubber Co., Naugatuck, Conn., processing techniques and formulations have now been developed to a point which clearly indicates that satisfactory film for the packaging industry, plasticized with monomeric, polymeric, and Buna-N types of plasticizers, either alone or in combination with each other, is possible. To date, however, the Armed Forces have withheld their approval; but it is in the cards that completely non-toxic vinyl film material should be available shortly.

With such a material in the offing, forward-looking extruders are pressing their demands for equipment which will satisfactorily extrude thin vinyl film from wide flat dies. The widest 1- to 3-mil film extruded by this method to date is only about 16 in. in width. It is necessary that this width be increased drastically—up to 80 or even to 100 inches. The only thin vinyl film of this width so far has been blown.

Many film manufacturers insist that accurate gage control in wide film requires the use of the flat die extrusion method. Present manifold dies either end-feed or center-feed, hold too large a volume of stock for successful operation with vinyl. Work is now in progress to improve this type die; one large manufacturer of extrusion equipment states that an extrusion setup complete with dies for flat die extrusion of thin film at least 54 in. wide will be in operation in less than six months.

Wire Coating

Another branch of the extrusion industry which is asking for improvements in equipment is that concerned with wire coating. For example, the Armed Forces field communications wire known as WD-1 has two layers of plastic, one of polyethylene and one of nylon. An outstanding authority on extrusion has stated that the faster this wire is passed through the cross-heads, the better the quality of the coating. He further states that the maximum possible speed today is approximately 2100 ft. per min., and that the factor controlling this maximum speed is directly related to the take-up equipment.

The metal reels on which WD-1 wire is rolled as it is produced are used over and over again. There are hundreds of thousands of these reels in existence, and the majority of them have become somewhat battered by use. As a result, the used reels are frequently statically and dynamically out of balance; this imbalance limits the speed to which they may be rotated for take-up, without practically shaking the rotating mechanism loose from its base.

A new development now under way will eliminate a large percentage of the difficulties caused by this imbalance of the take-up reels. It has been stated by an authority that in a very short time the speed of take-up will be increased to as high as 3000 ft. per min., practically a 50% increase over the present maximum.

More on Temperature

Elmer Szantay, Sandee Mfg. Co., Chicago, Ill., has more to say about the necessity for accurate control of temperature on extrusion machines. Many of his company's extruders are oil heated, and Mr. Szantay states that it was necessary to engineer and build special temperature control equipment simply because many of their products could not be satisfactorily produced because of the temperature variations encountered with the equipment installed on the machines when they were delivered.

His company, like so many others, has done a great deal of experimental work on various components of extruding machines, mainly relating to the screw or worm design. It has been his company's experience that each different type of job—vinyl garden hose or acrylic corrugated sheet stock, nylon extrusions or butyrate pipe—requires different worm-cylinder combinations, in order to get not only the best quality product, but also the most efficient use of the extruder. His company, like many others, engineers and builds these different features into their machines. It is his thought that the machinery manufacturers should make available, as standard equipment, different types of interchangeable worm-cylinder combinations.

Cut-Off Equipment

In discussing auxiliary equipment used by extruders, Mr. Szantay pointed out that, although automatic cut-off equipment is available today, and that for certain applications the equipment operates satisfactorily, there is a need for additional types of cut-offs. For example, compara-

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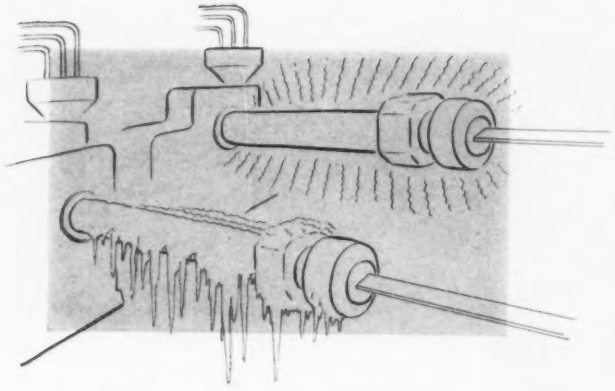


Material temperature variations in extruder barrels (10% plus or minus is considered to be good today) indicate that existing control equipment can be still further refined

tively heavy sections of material such as styrene or acrylic must be sawn in order to do a satisfactory cut-off job. To adapt a saw to this job, it is necessary that the saw move both in the direction of the travel of the extruded section as well as across it. Mr. Szantay suggests that an electrically heated knife or wire might be developed which could conceivably handle more different types of cut-off jobs than can the equipment available today.

While Mr. Szantay admits that there are many problems involved in his suggestion, he feels that some companies should exert every effort to solve them in order to bring this type of equipment to its peak of perfection. In fact, he states that his own engineers are fully aware of the needs of this field and are constantly working for solutions.

Surging

At the Eighth Annual National Technical Conference of the Society of Plastics Engineers, E. C. Blackard, Tennessee Eastman Co., Kingsport, Tenn., in discussing problems inherent in the extrusions of large piping and thin sheet, stated that surging is probably one of the greatest problems faced by extrusion machine designers. This intermittent change in the feed rate of material through a die is one of the greatest causes of dimensional variation in most extruded parts.

Tennessee Eastman has undertaken development work on screw design in their laboratory. The idea which they have developed and now recommend to the industry, entails cutting off a few inches of the delivery end of the worm, drilling and tapping the shaft, and then assembling to it an adaptor tip of special design. This tip is essentially a rounded nose, with a narrow spiral slot machined from one end to the other. In addition, the face or front end is slotted, so that in appearance it is somewhat similar to the face of a milling cutter. Mr. Blackard states that this design has helped increase back pressure in the extruder, and has gone a long way toward eliminating the surging problem. He still recommends, however, that more study is required on screw design to eliminate surging.

INJECTION MOLDING

A group of key men at Chicago Molded Products Corp., Chicago, Ill., offer several suggestions for the improvement of injection machines. It is their unanimous feeling that there is room for more highly perfected plasticizing units, which will not only heat material uniformly, but will also purge easily. Present-day heating cylinders continuously give trouble and entail heavy maintenance costs. These experts feel that pre-heating cylinders should be designed to be built into all types of injection machines; obviously, these men caution, such cylinders should not be made available until each different unit had been proved to function properly.

In the opinion of these men, these suggestions cover what are probably the greatest needs for improving injection machines as they are manufactured today.

This group also held forth on a subject in which the injection molding industry is in more or less unanimous agreement: most injection machines today would profit greatly by a greater clamping capacity. Present machines, although they plasticize sufficient material, are nearly always short of adequate clamping capacity.

More Platen Area

Along this same line, and again in agreement with many others, the Chicago Molded men pointed out that a decided increase in platen area is a must. When 8-oz. injection molding jobs have to be run in 22-oz. machines, simply because no small machine has sufficient platen area for the part, the result is obviously wasteful and uneconomical.

These men further point out that, when automatic mold setups requiring external arms or cams were developed, all of this external equipment had to be designed as a basic part of the mold. Also, the power to actuate these arms and cams had to be obtained from a source other than the molding machine itself. They feel that provision for this type of work should be designed into the machine itself.

In addition, this same group of men pointed a finger at most of the hydraulic pumps now supplied with injection machines; these pumps are usually too noisy and should be muffled in one way or another. The noise produced by such equipment is held to be highly objectionable, and this group stated very strongly that they felt the manufacturers of hydraulic pumps could well devote time to substantially reducing this source of noise in the molding plant.

The Ideal Machine

F. K. Davidson, vice president of Boonton Molding Co., Boonton, N.J., has been dreaming about the ideal injection machine for a good many years, although he states that the exact design of his ideal would depend largely on the type of work to be molded. In general, he feels that

the average job shop or custom molder could use a fast-action machine equipped with much more accurate heat controls than are available today; that much improvement can be made in the way of easily removable and easily cleaned cylinders.

Mr. Davidson also thinks that the present method of heating injection cylinders could be vastly improved; that a great deal of research is still to be done on torpedoes nozzles, and all the heated portions of the machine. In a pessimistic vein, he said: "Like all dreams, I doubt if this will come true." But, with the spirit of progress, he voices the opinion that the up-to-date molder will usually take the best machine he can get—and carry on his own improvements when the need arises.

Heavy Sections of Styrene

Also at the Eighth Annual National Technical Conference of the Society of Plastics Engineers, Gordon Thayer, Dow Chemical Co., Midland, Mich., discussed injection molding of heavy sections of styrene. In his discussion, he pointed out that one of the reasons for heavy section parts having residual strains was the packing of material in the mold. More material was forced into the mold than was actually necessary to fill out the piece and the part became dense and strained. Such parts require careful annealing in order to remove these strains. He suggested that trouble be remedied by the use of a "starved feed."

This "starve feed" technique involves the maximum possible stroke of the injection piston at each shot. This is accomplished by feeding to the injection chamber at each shot the exact amount of material required to fill out the mold. Mr. Thayer stated that the volumetric feeds now used as standard equipment on practically all injection machines are not accurate enough to accomplish this. Either too much material is loaded into the chamber, and packing results; or too little is delivered, and light pieces are molded. He claimed that, in order to get full satisfaction from the "starved feed" method of molding, it is necessary to use weigh feeding. This eliminates the inaccuracies in volumetric feeding due to variations in the bulk factor, which are mainly caused by variations in pellet size.

Mr. Thayer says: "We need a good weigh-feed unit which can be installed on present day injection equipment if the full advantage of the "starved feed" method of molding is to be realized."

He pointed out, further, that a weigh feeder was patented some 14 years ago for essentially the same purpose as is being recommended for it today. However, for one reason or another, it has not been adapted by the industry. It therefore, holds possibilities for the future.

Machine Limits

Elmer Szantay, previously quoted on the subject of extrusion, is also closely connected with the injection molding branch of the plastics industry. He points out that in many cases a molder having a certain capacity machine with a certain clamping area is prone to over-rate his machine when estimating on a job which is at the limit of the machine's capacity. This usually happens when a molder is estimating a thin-section, large-area part which in weight will be within the injection capacity of the machine, but in area will be too big to be properly clamped. It also occurs sometimes on very thick parts, where the molder guesses that, because the part weighs 16 oz., there is sufficient plasticizing capacity in his 16-oz. machine to run the job at a fairly fast cycle. It is admitted that this is foolish on the part of the molder, but it is a fact that mental over-rating of molding equipment still frequently leads molders astray in their estimating calculations.

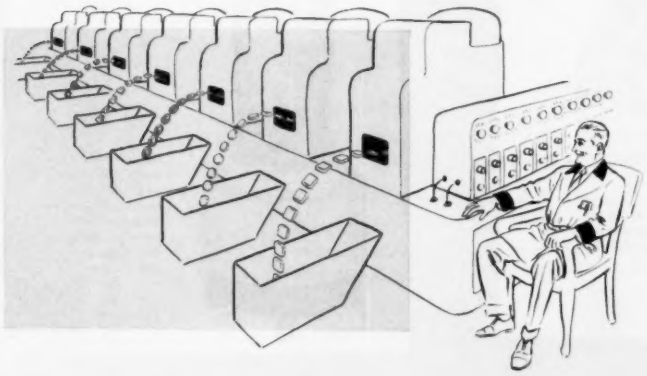
Mr. Szantay's suggestion is that machinery manufacturers investigate fully the capacity limits of their machines, both as to wall thickness and as to projected area. Then these manufacturers should have basic test molds made of various sizes and thicknesses of sections, to be used as comparisons by the estimator. Such test specimens—on the idea of ASTM test parts—could be agreed upon by all machinery manufacturers as standard. These test molds should be run by the machinery manufacturers, and the results of the test runs should be compiled into a booklet.

Such a booklet would indicate the best cycle recommended, the various temperatures which proved best on different materials, as well as all other pertinent information on the running of the test molds. Such a compilation of facts produced from the actual experience of each injection molding machine manufacturer would help to eliminate errors on the part of the molder.

Special Purpose Machines

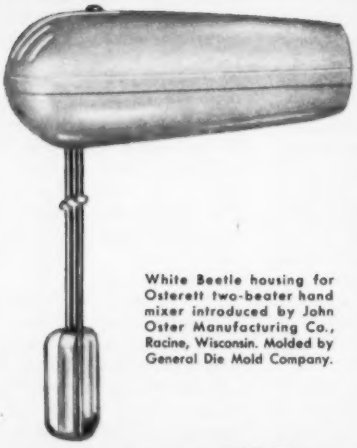
Conventional injection machines are of necessity what might be called general-purpose equipment, in that they are suitable for the production of a wide range of molded parts made from any of the different thermoplastics. Machinery manufacturers have hewed closely to this line, and therefore do not have

(*Continued on p. 144*)

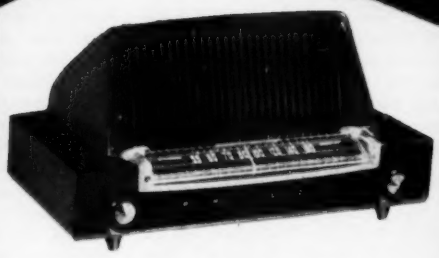


With all the machines available today—big, medium, and small—there is still need for very small, fully automatic units that operate with the speed of a punch press

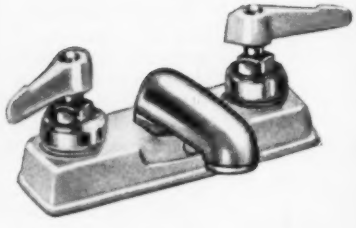
THERE'S A TREND IN THE MAKING . . .



White Beetle housing for Osterett two-beater hand mixer introduced by John Oster Manufacturing Co., Racine, Wisconsin. Molded by General Die Mold Company.



Philco's new concept of table radio, design #548M. Cabinet of maroon Beetle molded by Consolidated Molded Products.



Escutcheons of Beetle on new series of Sears, Roebuck & Co., plumbing fixtures in popular gray; compression molded by Plastic Masters, Inc.

New Waring Blendor, #PB5, has gray and white Beetle housing; molded by Watertown Manufacturing Company for Waring Products Corporation.

TREND TO COLOR STRONGER THAN EVER. BEETLE PLASTICS GIVE PRODUCTS COLOR . . . ANY COLOR . . . DURABLE

products with COLORFUL HOUSINGS SELL

but BEETLE® molding compounds give you more than color . . . .

BEETLE is a thermosetting plastic. That means it is rigid—that it has heat and flame resistance.

Engineers say BEETLE doesn't build up electrostatic charges (the housewife says this means it won't attract dust . . . stays attractive and clean).

With BEETLE, you get rich, attractive colors, and your housing has a solid substantial feel. And you can "mold in" any color you want.

BEETLE has a durable, hard, scratch-resistant surface . . . and even when scratching does occur, it is hard to see: the molded-in color goes all the way through from surface to surface. The advantages over a painted surface are obvious—and a valuable selling point!

BEETLE is easily wiped clean—and can be washed with soap and water again and again without damage to its beautiful surface. No rust, no tarnish; and no waxing or polishing needed.

BEETLE is a *quality plastic*. It will add quality—and sales—to your product.

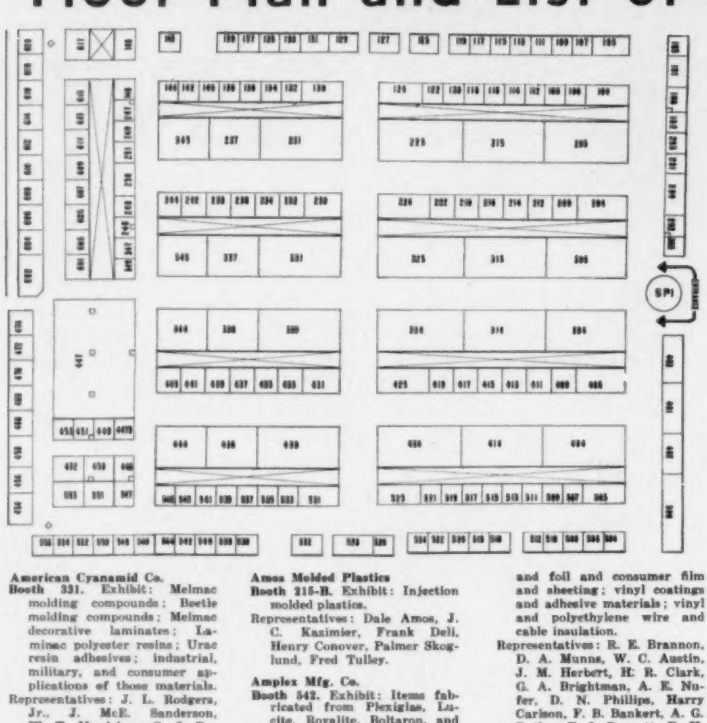
If you are housing an electrical part, here's another plus: BEETLE rates 102-136 under ASTM test method D-495-42, and many products made from BEETLE have easily earned ULI approval.

Let us tell your staff—both your sales and design people—more about the job BEETLE can do to make *your* product lead the sales parade in its field.

COLOR, ADVICE RE BEETLE FOR YOUR PRODUCT AVAILABLE FROM:

AMERICAN Cyanamid COMPANY
PLASTICS AND RESINS DIVISION
32 Rockefeller Plaza, New York 20, N. Y.

Floor Plan and List of Exhibitors at the 5th Na



American Cyanamid Co.
Booth 331. Exhibit: Melmac molding compounds; Beetle molding compounds; Melmac decorative laminates; Laminac polyester resins; Urac resin adhesives; industrial, military, and consumer applications of those materials.
Representatives: J. L. Rodgers, Jr., J. McE. Sanderson, W. T. MacAdam, C. J. Romieux, W. N. Finney, W. A. King, C. W. Johnson, J. F. Blais, H. B. Freeman, W. A. Ward, G. H. Rice, I. Robertson, R. A. Masur, F. H. Sorenson, H. S. Dudley, J. W. Shannon, E. V. Michal, J. L. Stanton, H. E. Dutot, J. Grabowski, R. Izzi, W. S. Sloatman, Jr., N. C. Martin, G. H. Melvin, R. B. Stoops, C. F. Dangelmajer, C. N. Patterson, I. H. Schupp, R. L. Hiller, L. G. Sanderson, S. F. Collins, H. M. Stepson, T. M. Wennergren, F. A. Vaincsky.

American Molding Powder & Chemical Corp., A. Bamberger Corp.
Booths 508-512. Exhibit: Ampacet Molding powders and products made therefrom; mother-of-pearl and other special effects in Ampacet polystyrene; plastics scrap reprocessing services offered by A. Bamberger Corp.
Representatives: Gerald F. Bamberger, Walter E. Hirts, Herbert H. Goldmark, Arthur L. Metzger, George A. Gould, George W. Weir, R. J. Neubecker.

American Wheelabrator & Equipment Corp.
Booths 609, 611. Exhibit: Wheelabrator plastics deflashing machine; Liquamatte wet blasting method of high-tolerance cleaning and finishing of plastic molds and bobs for plastic molds.
Representatives: Fred E. Uhl, Ted L. Fawcett, Fred K. Baldauf, George F. Burditt, Kenneth H. Blessing, David Logan, Charles L. Benham, E. B. Rich, J. A. Silver, A. E. Lenhard, L. J. Wieschhaus.

Amos Molded Plastics
Booth 215-B. Exhibit: Injection molded plastics.
Representatives: Dale Amos, J. C. Kazimier, Frank Deli, Henry Conover, Palmer Skoglund, Fred Tulley.

Amplex Mfg. Co.
Booth 542. Exhibit: Items fabricated from Plexiglas, Lucite, Royalite, Boltaron, and Fiberglas reinforced polyester resins.
Representatives: A. J. Kmsileff, Jack Benkin, Richard A. Keeler, Gerald E. Watt, Jim Kendig, E. E. Baker, Jr.

Anchor Plastics Co., Inc.
Booths 108-112. Exhibit: Custom extrusions in thermoplastics and their applications.
Representatives: Richard A. Fisch, F. Dick, J. B. Shapiro, R. Marx.

Apex Electrical Mfg. Co.
Booth 617.
Representatives: Edward L. Frants, Art Wiltshire, Ralph Lotz, Austin C. Saylor.

Art Roll Leaf Stamping Co. and Art Marking Specialists, Inc.
Booths 612, 614. Exhibit: Products made of all types of plastics, both thermosetting and thermoplastic, decorated by hot stamping, offset printing, or silk screening.
Representatives: Arthur N. Skeels, William Tyndall.

Avery Adhesive Label Corp.
Booths 111, 113. Exhibit: Pressure-sensitive labels and labeling methods for the plastics industry; electric label dispenser for pressure-sensitive labels.
Representatives: John S. Torrey, Michel Hamaty, S. W. Merkin.

Bakelite Co., Div. of Union Carbide and Carbon Corp.
Booths 314, 324. Exhibit: Phenolic molding materials; styrene molding materials; laminating and adhesive varnishes and resins; bonding materials; vinyl and polyethylene extrusion and molding materials; vinyl calendering materials; vinyl sheet and foil and consumer film and sheeting; vinyl coatings and adhesive materials; vinyl and polyethylene wire and cable insulation.
Representatives: R. E. Brannon, D. A. Munns, W. C. Austin, J. M. Herbert, H. R. Clark, G. A. Brightman, A. E. Nufer, D. N. Phillips, Harry Carlson, F. B. Bankert, A. G. Butler, F. I. Bennett, E. H. Gross, R. D. Noyes, W. B. Alexander, W. C. Quinby, A. F. Sward, J. R. Price, J. B. Knowles, T. W. Sharp, O. J. Johnson, C. W. Patton, R. A. Calsibet, J. E. Brister, J. D. Benedito, P. J. Rizzo.

Baldwin-Lima-Hamilton Corp., Hydraulic Press Dept.
Booths 246, 248. Exhibit: Baldwin-Defiance Model 20 compacting press, 75 ton capacity; Baldwin-Defiance Model 60 preforming press for high bulk factor materials.
Representatives: Robert G. Tabors, Byron B. Belden, John W. Majewski, Gordon R. Porterfield, Edward J. Doolittle, John J. Littley, A. L. Maiocco, A. F. Moore.

Bassons Industries Corp.
Booth 145. Exhibit: Reinforced plastics and thermoplastics for military and civilian use.
Representatives: Arthur Basson, George Lubin, Maurice Martin, Fred Lee, Maurice Basson, Fred Miniken, Gilbert D'Andrea, Alex London.

B. Blacher.
Booth 133. Exhibit: Method of slitting and sheeting plastic materials from rolls with a minimum amount of waste.
Representatives: Leo Blacher, Pauline Blacher.

Bolta Products Sales, Inc.
Booths 448, 450. Exhibit: Boltaron and products fabricated of Boltaron.
Representatives: Carl E. Holch, Arthur E. Read, Charles McCarthy, Bernard Thal, Thomas Drabek, Kenneth Chamberlain, Lawrence Thomas, William P. Elwell.

The Borden Co., Chemical Div.
Booth 101. Exhibit: Durite phenolic molding compounds and Durite industrial resins.
Representatives: R. N. Boucher, E. A. Johnson, W. W. Johnson, C. W. Niederauer.

Borkland Laboratories.
Booth 251. Exhibit: Products molded under the Borkland processes.
Representatives: G. W. Borkland, Frank Peace, R. A. Lersch, V. G. Borkland.

Celanese Corp. of America.
Booth 305. Exhibit: Products made from Celanese acetate molding compounds, films and sheeting, including some new applications, classic applications, defense products, and packaging.
Representatives: W. Stuart Landes, Edward W. Ward, Leopold Eckler, James W. Flynn, David S. Hopping, John J. Keville, Jr., W. Paul Moeller, James T. Growley, Samuel W. Murray, W. K. Woodruff, K. W. Kithil, J. W. Moore, Harriet Raymond.

Camfield Mfg. Co.
Booth 602. Exhibit: Glass fiber laminates.
Representatives: Carl E. Holmes, V. C. McCall, Augustin L. Fairchild.

Catalin Corp. of America.
Booth 345. Exhibit: Catalin Corp. activities in the resin and styrene molding powder fields; wood glues; textile finishing resins; laminates; bonding resins for the foundry, rock wool, abrasive, and cork industries; molded consumer and industrial styrene parts and products.
Representatives: L. Beck, V. Moss, E. Bastian, J. Weiss, J. Connolly, L. Leonard, W. Hupfel, A. Veale, F. Hadley, B. Porter, W. Hutchings, J. Wolek.

Chicago Molded Products Corp.
Booths 242, 244. Exhibit: Plastic molded parts produced by compression, injection and transfer molding, including new applications of nylon and other materials for the electrical, communications, automotive, scientific, and household appliance industries.
Representatives: Barto L. Attig, Nelson E. Gage, John J. Bachner, James E. Johnston, Charles S. Fegley, J. W. Stokes.

Ciba Co., Inc.
Booth 109. Exhibit: Araldite and Ardux resins for bonding, casting, and coating.
Representatives: John R. Charlton, Howard Dunn.

Coating Products
Booth 238. Exhibit: Mirro Brite metallic acetate and polystyrene; colored, embossed, laminated, and adhesive backed metallized acetate; printed cellulose acetate.
Representatives: M. M. Mainthow, R. H. Goodman, J. Abrams.

Conforming Matrix Corp.
Booth 454. Exhibit: Metal mask washing machine; air-operated masking fixture to paint a border on the glass face of a television tube; various masking tools and fixtures together with the finished painted parts.
Representatives: A. J. Spelker, Hamilton E. MacArthur, Milton T. Schimmel, Mrs. E. M. MacArthur, Elmer L. Faber.

Consolidated Molded Products Corp.
Booths 606, 608.

Cordo Chemical Corp. and Cordo Molding Products, Inc.
Booth 452. Exhibit: Dry process molding materials for reinforced plastics; resin impregnated materials; vinyl coated glass fabric specialties with decorative finishes; vinyl coating compounds.
Representatives: Lawrence Wittman, Edward C. Homan, H. Clinch Tate, H. Curtis Price, Bill Salt.

CrystalX Corp.
Booth 601. Exhibit: Methacrylate, Styrofoam, vinyl, and polyethylene parts.
Representatives: E. B. Westlake, Jr., J. A. Okie, R. W. Cockrill, F. J. Will, W. J. Grace.

Daily News Record
Booth 543.
Representatives: Kenneth Howry, Bertha Kaufman, Emery P. Laskey.

Dilts Machine Works, Div., The Black-Clawson Co.
Booth 548. Exhibit: Plastic takeoff for calendered or cast film, including cooling rolls, embosser, and plastic winder.
Representatives: F. C. Bower, E. G. Paxton, Jr., L. E. DeWeese, W. D. Haskell, R. J. Jacobs, H. S. Meadowcroft, J. W. Couture.

Distillation Products Industries Div., Eastman Kodak Co.
Booths 302, 403. Exhibit: Installation photographs of various size vacuum coating units; coated plastic samples produced in the respective units.
Representatives: A. H. Hartman, R. F. Moore, E. M. Brown, W. F. Dolke, T. C. Comer, D. C. Deyle, G. H. Bancroft, R. O. Johnson.

The Dow Chemical Co.
Booth 325. Exhibit: Recent applications of Styron polystyrene, Ethocel ethyl cellulose, saran, and Styrofoam.
Representatives: Donald L. Gibbs, Gage Olcott, Amos Ruddock, Howard MacDonald, R. L. Lownsbury, Corliss Cummins, Dean Ebey, H. Nickless, James Jones.

E. I. du Pont de Nemours & Co.
Booth 447. Exhibit: Applications of Du Pont materials including nylon, Alathon polythene resin, Teflon tetrafluoroethylene resin, and Lucite acrylic resin.
Representatives: Elmer F. Schumacher, Leslie B. Gillie, Harry R. Dittmar, Edward J. Pechin, William W. Beck, Arthur M. Cole, M. M. Taylor, P. Willard Crane, Josiah C. Moore, Jr., Ralph Teetsel.

Durez Plastics & Chemicals, Inc.
Booths 336 and 344. Exhibit: Applications of Durez molding compounds and resins.
Representatives: R. Bainbridge, E. Borro, Sr., M. Dubenitz, H. Kellogg, F. Lees, J. Ortner, L. Pentland, G. Wilcox.

The Dynakon Corp.
Booth 138. Exhibit: Fiberglas-polyester sheets, rod and moldings, including railroad tie plates, spools, pans, impactograph cases.
Representatives: Harry Raech, Frank Greifenstein.

Eldon Mfg. Co.
Booth 118. Exhibit: Plastic packages, cabinet hardware, industrial moldings, brushes, flower arranger sets.
Representatives: Robert Silverstein, Darrel Franey, Carl Popper.

Erie Resistor Corp.
Booth 531. Exhibit: Custom molded parts, including large injection molded pieces and three dimensional decorative finishing.
Representatives: W. H. Fryling, G. Groth, W. Conroy, J. Kilfoil, S. W. Duncan, D. Washabaugh, W. J. Neelon.

Farley & Loetscher Mfg. Co.
Booth 125. Exhibit: Farlite thermosetting laminated decorative products, including: decorative sheets, counter tops, dinette tops, engraving stock, Farlite panels, and Farlite desks.
Representatives: Fred R. Loetscher, C. E. Walz, R. J. O'Brien.

The Fellows Gear Shaper Co.
Booth 525. Exhibit: Fellows 1B-3-15 injection molding machine in operation.
Representatives: J. F. Hronek, F. R. Zumstein, D. E. Flint, F. C. Means, H. B. Flinn.

G. Feisenthal & Sons, Inc.
Booth 236. Exhibit: Air and sea navigation instruments; cockpit lighting panels made under military Specification AN-P-89; portable radio cabinets; trainer models of navigation instruments.
Representatives: Ben W. Rau, N. C. Ratner, H. F. Slottag, James H. Moses, James G. Feisenthal.

Ferro Corp.
Booths 516, 518. Exhibit: Ferro plastics colors.
Representatives: Russ Duncan, Ralph Riggs, Jim Jones, Art Murray, Henry Fishkin.

Fiberite Corp.
Booth 249. Exhibit: Parts molded from Fiberite, including contour chair, outdoor theatre speaker, gears, pulleys, etc.
Representatives: John E. David, Paul Bury, Paul Fina, David Sharpe.

Firestone Plastics Co., Inc.
Booth 444. Exhibit: Thermoplastic resins including: general purpose polyvinyl chloride resin; electrical grade polyvinyl chloride resin; polyvinyl chloride resin for both rigid and flexible uses; vinyl resin for solution applications; dispersion resin for plastisol organosol applications; high impact forming resin; high impact molding resin; acid-resistant coating resin.
Representatives: F. J. Groten, L. B. Kuhn, Henry Koehler, Jr., B. K. Lyckberg, J. R. Bukey, F. W. Schneider.

Flexfirm Products
Booth 140. Exhibit: Pre-Imp and Dry Ply glass fiber reinforced polyester molding compounds.
Representatives: Robert Milby, Robert Burton, Dudley Elchorn.

Foremost Machine Builders, Inc.
Booth 544. Exhibit: Plastic grinders; wheel and axle assembling machines for the toy industry.
Representatives: John P. Hunsicker, Philip Linder.

The Garlock Packing Co.
Booths 550, 552. Exhibit: Plastic mechanical packings for extreme service with acid, alkali, and other chemical applications.
Representatives: Ford Wilders, C. F. Palmer, Jr., J. M. Baird, J. W. Boerner, F. B. Campbell, F. D. Davis, V. R. Kleyla, T. L. Lafoon, P. D. Malloy, W. L. Mikell, A. C. Mohn, E. T. Parsons, L. B.

National Plastics Exposition, March 11 through 14

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W. H. Fryling,
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, counter tops,
ngraving stock,
, and Farlite

Fred R. Loet-
Wals, R. J.

Shaper Co.
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J. F. Hronek,
n, D. E. Flint,
H. B. Flinn.

Sons, Inc.
it: Air and sea
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radio cabinets;
s of navigation

Ben W. Rau,
H. F. Slottag,
ses, James G.

Exhibit: Ferro

Russ Duncan,
Jim Jones, Art
Fishkin.

t: Parts molded
including con-
outdoor theatre
, pulleys, etc.
John E. David,
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Co., Inc.
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polyvinyl chlor-
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Ford Wilders,
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Boerner, F. B.
. Davis, V. R.
Lafoon, P. D.
Mikell, A. C.
Parsons, L. B.

Snyder, W. J. Lauter.

General American Transportation Corp.
Booth 215 A. Exhibit: Refrigerator inner door panel; one-piece, 9-lb., battery jar molded on 300-ox. press; military and civilian Fiberglas parts; television cabinet; air conditioning cabinet and front louver panels; clock radios; freezer doors; one-piece refrigerator retainer frame; Meladur tableware; polyethylene freezer package covers; Fiberglas serving trays.
Representatives: Frank E. Seis, Arthur N. Williams, Harry M. Jenkins, James H. O'Connell.

General Electric Chemical Div.
Booth 231. Exhibit: Rubber-phenolic compounds; G-E 12853 fast cure compound and military specification materials; rubber-phenolic varnish; Monotop seamless one-piece melamine-surfaced decorative laminate kitchen surfacing; industrial laminates; extruded and molded plastics parts as well as mycalex and silicone rubber parts.
Representatives: A. J. Badula, L. K. Eber, W. Goss, E. M. Irish, A. P. Landall, N. W. Manning, D. T. Smith, P. Stahlberg, J. A. Zellhoefer, E. G. Gray, J. D. Rollow, J. G. Upton, J. R. Watt, W. W. White, P. E. Yergens, J. A. Buckley, A. F. Forni, G. S. Irby, J. G. Short, E. W. Winslow.

Gering Products, Inc.
Booth 436. Exhibit: Injection and extrusion grades of polystyrene, polyethylene, acetate, butyrate, vinyl, ethyl cellulose, acrylic, and nylon molding materials; Dryeol pigments for quick coloring of all thermoplastics; polyethylene and vinyl tubing and sheeting; special shapes, profiles, rods, sheets, tubes extruded from various thermoplastics; vinyl hose.
Representatives: T. I. O'Connor, Gerard C. Heldrich, Wayne M. Schrag, David Levine, J. D. Oakley, M. R. Sherman, Paul Holran, William Nathan, J. B. Chupinski.

B. F. Goodrich Chemical Co.
Booth 430. Exhibit: Applications of Geon polyvinyl materials and Hycar American Rubber; demonstration of a dip coating operation using a plastisol based on Geon paste resin.
Representatives: G. A. Fowles, W. D. Parrish, O. E. Isenburg, G. E. Field, R. C. Bascom, M. W. Osborne, Jr., R. F. Dettelbach, D. E. Sauser, G. A. Daum, S. G. Madden, E. B. Osborne, R. E. Koester, H. F. Engler, A. E. Grissom Jr., H. E. Connors, C. A. Clarke.

The Goodyear Tire & Rubber Co. Inc.
Booth 204. Exhibit: Pliovic vinyl chloride copolymer and its applications in rainwear, drapery material, garden hose, surgical tubing, refrigerator gaskets, vinyl flooring, fabric covering, and toys.
Representatives: H. R. Thies, C. O. McNeer, R. S. Earhart, I. N. Lanning, A. E. Polson, M. J. DeFrance, K. K. Fligor, J. M. Hussey, D. E. Neese, A. E. Whitney, J. W. Bear, E. J. Hill, J. A. Weatherford, R. E. Workman, R. T. Hickcox.

Hardesty Chemical Co., Inc.
Booth 148. Exhibit: Sebacic acid and its derivatives.
Representatives: H. M. Abbott, O. R. Brunkow, M. A. Pollack, F. H. North, J. T. Crosby.

Hercules Powder Co.
Booths 102, 201, 203. Exhibit: Slide films dramatizing Hercules' contributions to users of cellulosic plastics material; new sketches by Sundberg-Ferar of large injection molded sections; new Herculoid plasticizers.
Representatives: C. W. Eurenius, L. T. Barnette, A. R. Olsen, James W. Monkman, Henry Thouron, J. M. Martin, W. O. Bracken, F. W. Debree, J. G. Fuller, Jr., Earl Wenger, George Bossert, P. A. Belk.

Honan-Crane Corp., Subsidiary of Houdaille-Hershey Corp.
Booths 451, 453. Exhibit: Honan-Crane oil purifiers; Houdaille water and oil separator
Representatives: D. J. Jones, J. E. Pirie, E. W. M. Bennett, J. R. McCoy, L. B. Duntley.

Hurlbut Paper Co.
Booth 146. Exhibit: Absorbent paper for use in decorative and industrial plastic laminates; samples of laminates made with Hurlbut absorbent papers.
Representatives: Edward A. Sitser, James M. Burt, Lester L. R. Phillips, Hans F. Ariedter.

Hy-Sil Mfg. Co.
Booth 435. Exhibit: Metallized plastic sheeting, colored plastic sheeting, and items made from these materials.
Representatives: Walter Hirsch, Lester Fields, Richard Silverman.

A. L. Hyde
Booth 532. Exhibit: Injection molded products.
Representatives: Arthur S. Hyde, M. L. Nevius.

The Hydraulic Press Mfg. Co.
Booth 414. Exhibit: 48-oz. preplasticizing injection molding machine; 200-ton reinforced plastics molding press.
Representatives: John C. Cotner, John M. Dolan, R. W. Powell, W. S. Renier, C. P. Terry, W. F. Mericle, C. J. Ziegfeld, John Parks, Art Linsell, E. Oehling, B. D. Ashbaugh, Don Taylor, Don Barkhurst, Frank Chute, Chester Beam.

Improved Paper Machinery Corp., Plastic Molding Machinery Div.
Booths 400, 401. Exhibit: Impco HA4-175 four- to six-oz. horizontal injection molding machine in operation.
Representatives: H. M. Allard, Frank E. Bailey, Lyle V. Burford, George G. Doughty, Lewis W. Huntley, Francis Joyce, Hibbert W. Moss, George W. Whitehead.

Industrial Mfg. Corp.
Booth 127. Exhibit: Thermolator mold temperature control.
Representatives: H. A. Meyrick, F. W. Jennison, Norman Krone, W. E. Ellsworth.

Industrial Ovens, Inc.
Booth 468. Exhibit; Laboratory size (24 in. web width) combination reverse roll, knife, and impregnation coating machine; Kodachrome transparencies illustrating various types of machines and equipment for the application of plastic coatings on webs.
Representatives: C. A. Litzler, J. K. Gillett, George H. Goecke, John P. Clark, Jr., Edward R. Talone, A. N. Mason.

Instron Engineering Corp.
Booths 511, 513. Exhibit: Tensile testing instruments; compressing testing equipment; jaws for tensile testing; integrating instrument.
Representatives: George S. Burr, Harold Hindman.

Interchemical Corp., Finishes Div., Printing Ink Div., and Coated Products Div.
Booths 214, 216. Exhibit: Printed vinyl film; molded plastisols, foamed vinyl plastisols, and molded plastigels; artificial leather finishes; molded and laminated polyester articles; printed film packages; IPI Anilox hand proofer; synthetic coated fabrics.
Representatives: C. M. Robbins, S. A. Moore, A. J. Capalbo, G. F. Goldstein, R. R. Browning, K. J. Carson, A. B. Marsh, E. H. Davis, J. W. Viner, D. E. Tuttle, O. C. Holland, O. Unglaub, H. Saam, H. McMurray, V. Donovan, J. F. McCann, J. A. Besaler.

Jackson & Church Co.
Booths 551, 553. Exhibit: Injection molding machines.
Representatives: J. W. Hendry, C. Bennett, M. Buzzee, W. Kienbaum, C. Kober, H. Rank, M. Steggall.

The M. W. Kellogg Co.
Booths 129, 131. Exhibit: Kel-F Polytrifluoro - chloroethylene thermoplastic.
Representatives: Louis C. Rubin, Walter J. Merck, Julius A. Jupa, Francis M. Rugg les, Stanley W. Jones, Jr., Chester R. Leder.

Koppers Co., Inc., Chemical Div.
Booth 424. Exhibit: Injection molded and extruded polystyrene products, civilian and military; civilian and military applications of Penacolite adhesives.
Representatives: D. M. Rugg, T. C. Keeling, M. C. Bailey, C. J. Snyder, R. M. Macdonald, E. H. Young, J. W. LaBelle, H. D. Cooper, J. B. Schmitt, H. C. Carlson, J. L. Taylor.

W. T. LaRose & Associates, Inc.
Booth 105. Exhibit: High frequency heating equipment for compression, transfer, and plunger molding, for extruder preheaters, and for continuous drying.
Representatives: W. T. LaRose, S. T. Miles, V. S. Wagner, J. P. Moran, B. Singer, J. E. McCabe, A. J. Siegmeth.

Lester-Phoenix, Inc.
Booth 224. Exhibit: Lester injection molding machine in operation; products molded on Lester equipment of various capacities.
Representatives: H. Bollinger, H. Jeck, D. White, D. Sloane, W. Schwartz, E. Mast, A. Geers, J. Geers, S. Krould, T. Thoreson, F. McCosh, J. Schmidt, D. Williams, J. Ogilvy.

The Lewis Welding & Engineering Corp.
Booths 538, 540. Exhibit: Lewis No. 4 plastics injection molding machine.
Representatives: J. T. Lewis, Jr., W. A. Pearse, Jr., C. E. Miller, Johann Muller, Louis Markell.

Loven Chemical of California
Booth 103. Exhibit: Phenolic molding compounds and parts made of those materials.
Representatives: Harry C. Millerburg, C. R. Olsen, Theodore T. Hayes.

Lumite Div., Chicopee Mfg. Corp. of Georgia
Booth 124. Exhibit: Lumite saran screening; Lumite saran fabric; Lumite industrial fabrics.
Representatives: J. F. Nicholl, G. H. Day II, J. F. Rohs, G. V. Atkison, Edward White IV, L. W. Maier, Jr., J. W. Veeder.

Machine Design
Booth 447B.
Representatives: Robert L. Hartford, Howard H. Dreyer, Russell H. Smith, Edward S. Lawson.

Mack Molding Co., Inc.
Booth 545. Exhibit: Refrigeration pieces, automotive pieces, closures, ordnance pieces for the Army and Navy.
Representatives: D. S. Kendall, K. W. Macksey, S. I. Howell, J. McIntosh, S. J. Heisper, E. A. Jefferies, J. McIntosh, Jr., R. Hoonhout.

Manco Products, Inc.
Booth 135. Exhibit: Tru-Cast beryllium copper cavities and cores for plastic molds and zinc diecast dies.
Representatives: M. A. Nichols, J. P. Healey, A. Milligan, John C. Reib, G. Palmer Humphrey, Irving A. Carr.

The Marblette Corp.
Booths 458, 466. Exhibit: Liquid and cast phenolic resins; finished products made of cast phenolic.
Representatives: Robert A. Grayson, Max Hilrich, Dumont Andersen, Philip Mackinson, John Omaggio.

Materials & Methods Magazine
Booths 400, 402.
Representatives: William P. Winsor, T. C. DuMond, H. R. Clauser, Fred P. Peters, Kenneth Rose, Philip O'Keefe, Jr., John L. Everhart, A. E. Fountain, D. W. Huettner, M. Randolph Long, Frank J. McKinley, Berin Smith, John N. Carlin, John Cunningham.

Mayflower Electronic Devices, Inc.
Booth 528. Exhibit: Continuous rotary sealer; high frequency generator with attached press; high frequency generator operating two presses.
Representatives: Edward J. Wohlfarth, Jack Stewart, Robert Collins, Arthur Gelernter, Harold Coleman.

Modern Plastic Machinery Corp.
Booth 250. Exhibit: 1½-in. and 2½-in. MPM extruders; 12-ft. conveyor; slides showing all sizes of extruders and accessories.
Representatives: W. J. Johnson, E. Tanis, A. Kudlach, C. Riker.

Modern Plastics Magazine
Booths 431, 433.
Representatives: C. A. Breskin, A. S. Cole, T. B. Breskin, P. H. Backstrom, M. A. Olsen, J. M. Connors, R. C. Beggs, S. S. Siegel, H. McCann, A. P. Peck, R. L. Van Boskirk, F. B. Stanley, W. H. Goodman.

Molded Products Corp.
Booths 437, 439.

Monsanto Chemical Co.
Booths 216, 222, 225. Exhibit: New color service; improved formulations in thermoplastic molding compounds; new vinyl sheeting material; new developments in Monsanto plastics.
Representatives: F. A. Abbiati, R. K. Muller, Charles Lichtenberg, E. L. Hobson, R. C. Evans, E. D. Kennedy, D. Guarnaccia, T. Lawton, D. S. Plumb, S. L. King, T. G. Martin, E. S. Bauer, R. Fordyce, C. Richards.

Moslo Machinery Co.
Booths 504, 506. Exhibit: Moslo hand and hydraulic plastic molding machines from ⅝ oz. to 2½ oz.; colorblends and Disperse dry colorants made by Mid-America Plastics, Inc.
Representatives: Ernest P. Moslo, Ben J. Moslo, H. W. Green, Carl Fromm, Harlan Stanley, Albert Klafka.

J. Frank Motson Co.
Booth 115. Exhibit: Printing on plastics, glass, metal.
Representatives: George R. Stewart, J. Wm. Henry, Jr.

J. M. Nash Co.
Booth 479. Exhibit: Nash #103 automatic flash lathe (continuous turret travel); Nash #103-B automatic flash late (intermittent motion on turret).
Representatives: A. Kluge, George McGuire, R. Bodendoerfer, J. A. Christensen.

National Lead Co.
Booths 472, 474. Exhibit: Chemicals, including stabilizers, plastisols, organosols, Bentones (gelling agents for organic liquids used in plastigels); end products, such as film and sheeting and molded and extruded items, including shower curtains, raincoats, garden hose, upholstery, automotive parts.
Representatives: J. G. Collins, Walter Morris, Hugo Ratti, Elliot Gordon, Abb Scarborough, Bill Kellner, Peter Rizzo, Fran Lautrell, Charles Kuntzman, Bill Blackmore, Ed Melvin, Bill Klein.

National Rubber Machinery Co., Plastics Machinery Div.
Booth 456. Exhibit: NRM plastic extruding machines from 1 to 8 in. in size; samples of various types of extruder screws.
Representatives: H. E. Buecken, E. E. Heston, E. R. Coddington, D. V. Blatter, Halbert Frank.

Naugatuck Chemical, Div. United States Rubber Co.
Booths 409-419. Exhibit: Marvinol vinyl resins; Vibrin polyester resins; Kralastic molding powders; products and processes demonstrating outstanding advantages of these three types of raw materials.
Representatives: Earle S. Ebers, Harold M. Parsekian, Richard L. Melamphy, William McHale.

New Hermes Engraving Machine Corp.
Booth 107. Exhibit: Portable and bench type pantograph engraving machines for both metal and plastics.
Representatives: N. Schimmel, G. Gruettner, Mr. Laird, M. Kaufman.

Northern Industrial Chemical Co.
Booth 610. Exhibit: Custom molded plastics products.
Representatives: F. Reed Estabrook, Jr., D. M. Gawthrop, J. H. Beach, F. C. Meacham, H. H. Wanders, G. V. Sammet, Jr., W. S. Ewell, Jr., C. M. Cunningham, E. H. Goudy.

Nylon Molded Products Corp.
Booth 539. Exhibit: Custom molded nylon parts for a variety of uses; the difference between properly molded and improperly molded nylon.
Representatives: Gilbert J. Stein, Sylvan H. Rosenfield.

Omni Products Corp.
Booth 230. Exhibit: The company's function of making available plastics materials, machinery, and methods from leading American sources through world-wide network of offices and agencies.
Representatives: Tino Peruts, G. L. Ottens, Robert Ernst, Walter Geber, F. M. Gottheimer.

Owens-Corning Fiberglas Corp.
Booth 405. Exhibit: Fiberglas roving, chopped strands, mat, and fabrics for use in reinforced plastics.
Representatives: Ralph Perkins, Jr., George K. Hammond, William F. Condon, William H. Howell, John D. Lewis, Clare E. Bacon, Ralph H. Sonneborn, Charles E. Hoover.

Panelyte Division, St. Regis Sales Corp.
Booths 533, 535. Exhibit: Laminated resinous plastics sheets, rods, tubes, and fabricated parts; molded specialty laminates; macerated laminates; injection molded parts; reinforced plastics.
Representatives: D. F. Sweet, V. L. Kiernan, R. C. Prall, D. T. DeBow, W. Kope, A. Wolfsinger, J. Murphy, A. Oberdorfer, V. Moldt, J. Brady.

Parkwood Laminates, Inc.
Booth 517. Exhibit: Decorative laminates; decorative and industrial applications of Compreg; die stock.
Representatives: S. R. Thayer, G. K. McLean, H. French.

The Patent Button Co. of Tennessee, Inc.
Booth 536. Exhibit: Custom molded products; stock range hardware; molded textile items.
Representatives: Harold J. Melloy, W. D. Edwards, Charles C. Bradford, Jr., John K. Burry.

Pittsburgh Coke & Chemical Co.
Booths 137, 139. Exhibit: Pittsburgh PX plasticizer.
Representatives: Henry Avery, Harry W. Dudley, Dennis J. Killian, Jr., A. J. Oxenham, Harry F. Pfann, Dan M. Rugg, Jr., W. D. Schroeder, Myron Sharp, Richard Welsch.

Plaskon Div., Libby-Owens-Ford Glass Co.
Booths 394, 500, 501, 502. Exhibit: Products made of Plaskon urea, alkyd 420 and Fiber-Glass reinforced alkyd plastics; glues and industrial resins; coating resins.
Representatives: W. W. Knight, Jr., Carleton Ellis, Jr., H. W. DeVore, R. F. Mackessy, R. M. McGee, D. W. Towler, J. A. Joyce, P. F. Huidekoper, O. W. Lowry, Jr., M. A. Brown, E. W. Hicks, G. A. Taylor.

Plastics World.
Booths 347, 349.
Representatives: C. W. Cleworth, George W. Rhine, William B. Cowilich, W. Paul Pincher, Joseph Gilbert, Dudley Trott, Gordon Gannett, Joseph Mehr.

Plastimold Corp.
Booth 114. Exhibit: Custom molded products.
Representatives: John Stenberg, Arthur N. Grossberg.

Plax Corp. and Standard-Knapp
Booth 545. Exhibit: Polystyrene, methacrylate and polyethylene sheet, rod, and tubing; Plaxpak blow-molded bottles from ½-oz. capacity to 1- and 2-gal. sizes; extruded, fabricated, and molded thermoplastic products.
Representatives: H. E. Griffith, Denton Anderson, J. H. DuBois, George E. Pickering, W. W. Willett, L. A. Cermola, E. Don Fam, E. S. Morris, Richard Muller.

Polyplastex United, Inc.
Booths 605, 607. Exhibit: Polyplastex Fiberglas and plastic material for such uses as lampshades, wall panelling, displays, decorative screens, and industrial applications.
Representatives: H. W. E. Riley, J. J. Jordan, T. B. Thorsen, W. Sieger.

Product Engineering Magazine
Booth 292.
Representatives: Albert Hauptli, George F. Nordenholt, Adkins Lowell, D. G. Jones, D. C. McGraw, J. A. McGraw.

Radio Receptor Co., Inc.
Booth 130. Exhibit: Thermatron electronic welding equipment for plastics; presses, generators, jigs and dies, and products made with that equipment.
Representatives: Ivan H. Schwartz, Harold N. Krongold, Anthony Crupi, Jr., Peter B. Black, H. A. Jongeblood, Gordon Moos, Shirley Phillips.

Reed-Prentice Corp.
Booth 200. Exhibit: Photographs of injection molding machines and representative plastic products produced on these machines; photographs showing installations of Reed-Prentice injection machines in various molding plants.
Representatives: F. W. McIntyre, Sr., F. W. McIntyre, Jr., J. H. Wolcott, A. R. McIntyre, J. D. Sherman, W. O. Elliott, D. G. Eaton, C. J. Holland, I. J. Freeman.

Reeves Pulley Co.
Booth 602. Exhibit: Variable speed power transmission equipment, including Vari-Speed motor pulley, Vari-Speed Junior motor pulley for light machinery, Vari-Speed Motordrives, and variable speed transmissions.
Representatives: Phil C. Talbot, Joseph H. Gepfert, C. E. Hill, John Mahoney, Howard D. Taylor, James P. Reeves, Robert F. Reeves.

Regal Plastic Co.
Booths 117, 119. Exhibit: Deep-formed and fabricated parts made of Royalite, Boltaron, Plexiglas, Lucite, acetate, vinyl, and butyrate; carrying cases for cameras, projectors, dictaphones.
Representatives: Jerome S. Kivett, W. C. Schlager, George Nelson, Henry Richter, Peter Weidenbacher.

Reichhold Chemicals, Inc.
Booth 337. Exhibit: Materials bonded and laminated with Reichhold Plyophen resins.
Representatives: Harry Kline, Mark K. Pinkerman, G. A. Olson, J. H. Robertson, E. S. Hewes, James Smith, Rudy Thuemmler, Gene Lamont, Fred Grosius, Jr., Harry Crofton.

Respro Inc.
Booth 315. Exhibit: Resproid vinyl film and sheeting and examples of end products made from Resproid.
Representatives: R. S. Newell, J. E. Manion, F. R. Fitzpatrick, A. J. Hanley, W. H. Young, Jr., W. Falencki, N. Cohen, C. Mooney, K. G. Mooney.

Roehlen Engraving Works, Inc.
Booth 520. Exhibit: Embossed materials and samples.
Representatives: Hans S. Vohs, C. Raymond Kerrigan, George R. Weinmann.

Rohm & Haas Co.
Booth 265. Exhibit: Plexiglas sheets and molding powders and their applications in various fields, including signs, lighting, glazing, automotive parts, and merchandise displays; flat and corrugated sheets extruded from molding powder.
Representatives: D. A. Rothrock, N. G. Wedemeyer, W. T. Reedy, D. S. Plume, Reimer Schacht, R. L. Gardner, E. M. Passmore.

Alfred A. Rosenthal
Booth 526. Exhibit: Molds for injection molding; products molded by clients abroad with molds designed by exhibitor; photographs of production lines for plastics goods set up by exhibitor in foreign countries; literature describing engineering and consulting services.
Representatives: Alfred A. Rosenthal, David H. Rosenstock, Eric Marx.

Ross & Roberts Sales Co., Inc.
Booth 604. Exhibit: Calendered, embossed, and extruded vinyl film.
Representatives: Alvin V. Roberts, George H. Pollack, Robert J. Snyder, F. J. Tremonte, L. A. Bergman, M. A. Reiner.

Russell Reinforced Plastics Corp.
Booth 616. Exhibit: Strux and reinforced laminate materials; aircraft and industrial parts made of these materials.
Representatives: Dan Haines, Bill Anderson, Ed Salser.

Shawray Plastics Corp.
Booth 618. Exhibit: Vinyl and polyethylene films, printed and embossed; molded films; electronic quilting; laminations; surface printing; packaging material.
Representatives: Arthur Blumenthal, Edward D. Shaw, Martin Manne, Matthew Towers, Stanley Wolff.

Sill Industries, Distributor for Industrial Radiant Heat Corp.
Booth 615. Exhibit: Manual vacuum forming machine; Fiber Glass Super-Heater.
Representatives: Harold N. Bross, Thomas F. Walsh, Lionel Sheflan, B. J. Lyster, E. Bowman Stratton, Jr., Chung-Sheng Na.

Singer Sewing Machine Co.
Booths 232, 234. Exhibit: High frequency bonding machine; lock stitch machine with compound or needle feed; ruffling machine for plastics or fabrics.
Representatives: H. G. Klawunn, George Rice, P. R. Mohney, H. C. Morehouse, W. A. Ketcham, Harry McDowell.

South Florida Test Service
Booth 515. Exhibit: Photographs of exposure facilities; test samples on exposure at inland proving grounds and salt atmospheric base; instrumentation for measuring and recording solar radiation, both direct and under glass.
Representatives: Earl M. DeNoon, Warren W. Smith.

Steiner Plastics Mfg. Co., Inc.
Booths 132-134. Exhibit: Fabricated acrylic plastic items for both civilian and defense use, including aircraft parts, signs, lettering, skylights, and lighting fixtures.
Representatives: Mark Steiner, Henry Stauffer, Robert Coombs.

Sterling, Inc., Industrial Control Div.
Booth 116. Exhibit: Model 6002 mold temperature control unit.
Representatives: Paul A. West, John B. Ballard, Wm. H. Schneider, Jr., Charles H. Herrick.

F. J. Stokes Machine Co.
Booth 230. Exhibit: Stokes-Windsor RC-200 extruder compounding and pelletizing rigid vinyl; Stokes Model 800 fully automatic plastics molding press molding small alkyd parts; Stokes vacuum metallizing unit producing metallized plastic parts.
Representatives: Malcom Adler, Frank Arpajian, Frank Cramton, G. J. Crites, Sam Greenwood, Stew Helliwell, A. A. Hutchings, Walter Rayher, Harold Roman, Gordon Seiter, Jay Steiner, Dave Stokes, Dick Strong, Ed Walker, Quent White, Sandy Zimmerman.

Surprenant Mfg. Co.
Booth 293.

Synvar Corp.
Booth 136. Exhibit: Phenol-formaldehyde, urea-formaldehyde, phenol-furfural, polyvinyl acetate, and polyester resins; articles made of these resins and compounds.
Representatives: L. F. Bornstein, Joseph M. Hoopes, Earl Erdman, Samuel Breskman, William J. Dunnican, Harold Matteson.

Taco West Corp.
Booth 547.

Tennessee Eastman Co.
Booths 237-245. Exhibit: Tenite I cellulose acetate plastic molding compound; Tenite II cellulose acetate butyrate plastic molding compound; products made from these two materials by continuous extrusion and injection molding; special exhibit of extruded Tenite plastic pipe.
Representatives: S. E. Palmer, T. E. Dudney, J. F. Hill, W. R. Groover, T. L. Loveless, J. R. Pecktal, W. L. Searles, J. B. Williams, G. W. Carpenter, C. B. Fox, Jr., J. M. Marvin, C. L. Seay, J. G. Slater, R. L. Bailey, D. C. Guthrie, A. B. Thurman.

United States Rubber Co., Royalite Plastic Products.
Booths 441, 445. Exhibit: Royalite products.
Representatives: T. R. Grimes, D. W. Reed, H. L. Darling, A. I. Hanfling, R. S. Cole.

The Van Dorn Iron Works Co.
Booth 104. Exhibit: Two-oz. automatic plastics injection press in operation; plastics scrap granulator in operation; parts manufactured on Van Dorn presses; fabricated non-plasticised polyvinyl chloride fittings, tanks, etc., made by Luco-Flex Div.
Representatives: J. J. Reichel, H. H. McNash, W. J. B. Stokes II, G. H. Koch, Jr., E. Jaynes, J. Jones, W. Hatfield.

John Waldron Corp.
Booths 120-122. Exhibit: Equipment for coating, casting, laminating, impregnating, embossing, printing, etc., on plastic films and coated webs; techniques for applying vinyl solutions, organosols, plastisols, hydrosols, latices, as well as alkyds, phenolics, polyesters to woven and non-woven webs of cotton, paper, glass, nylon, viscose; actual production equipment in operation for embossing plastic films.
Representatives: D. G. Higgins, Anthony Pomper, Charles J. Waechter, Cliff Bischoff.

The Watertown Mfg. Co.
Booth 100. Exhibit. Various custom moldings produced in the past year; Lifetime Ware.
Representative: Jon Hedu.

The Watson-Stillman Co.
Booths 208, 212. Exhibit: Installation photographs of Watson-Stillman equipment; plastics products produced on that equipment.
Representatives: R. W. Schreck, R. F. Fehr, C. Huising, R. A. York, H. L. Henry, R. E. Davis, R. G. Milnes, A. M. Hekking, B. Bonin

Westchester Plastics, Inc.
Booth 541. Exhibit: Unicolor color concentrates; pearlescent materials; raw materials, including polyethylene, vinyl, acrylic, styrene, and Pliothene (soft polyethylene); products molded or extruded from these materials, such as belting, bottles, beads, jewelry.
Representatives: Joseph F. Jehle, Red Petersen, Robert R. Kobak.

Westinghouse Electric Corp.
Booths 404, 505, 507, 509. Exhibit: Molded and fabricated industrial Micarta products, including steel, textile, automotive, aviation, and electrical industry applications; decorative Micarta as used in bathrooms, kitchens, and furniture.
Representatives: J. E. Callahan, L. A. Pedley, G. F. Sutton, E. E. O'Connor, F. P. Hunsicker, E. L. Wolfe, D. O. Allen, R. P. Fleming, F. J. Cagliari, V. E. Ens, G. E. Snyder, R. J. Harden, W. A. Hice.

Edwin L. Wiegand Co.
Booth 247. Exhibit: Electric tubular, strip, cartridge and finstrip elements for heating platens, dies, molds, cylinders, nozzles, hoppers; electric circulation heaters for heating oil, transfer mediums, air, or steam in large quantities; electric radiant heaters for fusing vinyl, heating slush molds, drying granules, baking C process shell molds, and heating high pressure laminates and other plastics for post-forming.
Representatives: C. F. Kreiser, J. L. Devlin, S. C. Campanella.

Wilner Wood Products Co.
Booth 537. Exhibit: Various meshes of wood flour manufactured from kiln dried white pine.
Representatives: Joseph R. Wilner, Burton L. Wilner.

World Plastex
Booth 546. Exhibit: Manufactured items in which extrusions are component parts.
Representatives: Milton Book, Leon A. Cook, Charles F. Hutcheon, E. B. Leimseider, George Streisguth.

5th National S

EXPOSITION WEEK PRO

Tuesday, March 11

12:30-5:30. National Plastics Exposition, Convention Hall

6:00-7:30. Reception for Conference Registrants, Bellevue-Stratford Hotel

Wednesday, March 12

10:00-12:30. Conference session, Convention Hall Ballroom

12:30. SPI Engineering and Technical Policy Committee luncheon, Bellevue-Stratford Hotel

12:30-10:00. National Plastics Exposition, Convention Hall

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The Exposition will be held at Convention Hall, Philadelphia, March 11-14. It will include displays by manufacturers of plastics materials and of machinery and equipment for processing and handling plastics, molders, laminators, extruders, and fabricators. Theme of the Exposition is: "Plastics Personify Progress."

Industrial and Trade Users of plastics are invited to attend the Exposition, which will *not* be open to the general public. Special emphasis is being placed on encouraging attendance of military purchasing personnel and industry's top management, research directors, production executives, and purchasing agents.

The Conference will be held in the Ballroom adjoining Convention Hall on the mornings of March 12, 13, and 14. The conference program

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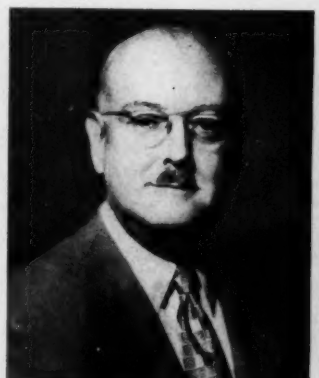
Will Foll



Dr. Robert P. Brecht

Dr. Reavis Cox

al S.P.I. Plastics Exposition and Conference

EEK PROGRAM

Thursday, March 13

10:00-12:30. Conference session, Convention Hall Ballroom

12:30. SPI Injection and Compression Molders Divisions, joint luncheon, Convention Hall dining room

12:30-5:30. National Plastics Exposition, Convention Hall

Friday, March 14

10:00-12:30. Conference session, Convention Hall Ballroom

12:30-5:30. National Plastics Exposition, Convention Hall

is being conducted in cooperation with the Wharton School of Finance and Commerce of the University of Pennsylvania.

March 12 session will include the following speakers and subjects:

Dr. Robert P. Brecht, president, National Office Management Association and Professor of Industry, Wharton School: "Modern Management Techniques."

Dr. Reavis Cox, Director of Research Projects for Retail Credit Institute of Marketing, Professor of Marketing, Wharton School: "Marketing's Contribution to the Value of a Product."

Dr. Charles R. Whittlesey, Professor of Finance and Economics and Chairman of the Department of Finance, Wharton School: "What Will Follow the Mobilization Buildup?"

March 13 session will include:

Dr. George W. Taylor, Professor of Industry, Wharton School, and former chairman, Wage Stabilization Board: "Industrial Relations in the Defense Economy."

Dr. John R. Abersold, Professor of Industrial Relations and Personnel Administration, Wharton School: "Personnel Development."

William Crean, partner in Lacy Sales Institute, Newton Center, Mass., Instructor at Boston U.: "What Makes a Star Salesman Tick?"

March 14 session will include:

Frazier Groff, Assistant Director of Development, Bakelite Co.: "Styrene Compounds as New Tools for Industry."

Alvin H. Hartman, Sales Manager, Vacuum Equipment Dept., Distillation Products Industries, Rochester, N. Y.: "Vacuum Metallization Process in Plastics."

Another speaker to be announced.

Conference committee consists of A. L. Hyde, A. L. Hyde Co., Grenloch, N. J. (chairman); L. T. Barnette, Hercules Powder Co., Wilmington, Del.; David A. Thomas, American Insulator Corp., New Freedom, Pa.; Reimer Schacht, Rohm & Haas Co., Philadelphia, Pa.; J. Frank Motson, J. Frank Motson Co., Philadelphia; J. Chester Crowther, Bachmann Brothers, Inc., Philadelphia; and Robert G. Tabors, Baldwin-Lima-Hamilton Corp., Philadelphia.

List of Exhibitors begins on inside fold, with a floor plan of the exposition hall and condensed information on what each exhibitor will be showing and who will represent the company. List is up to date as of Feb. 1.

Alvin H. Hartman

Frazier Groff

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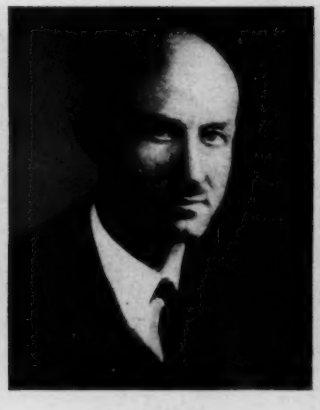
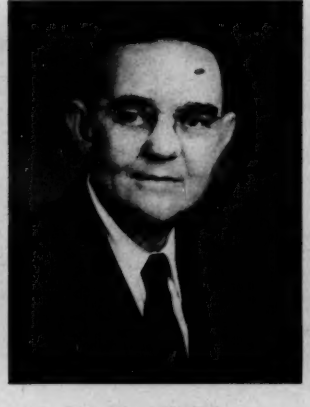
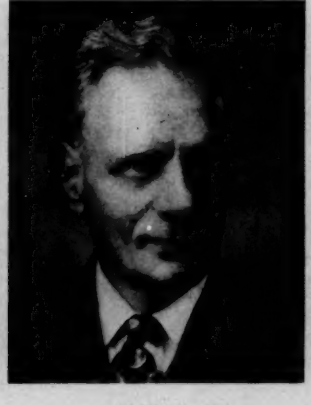


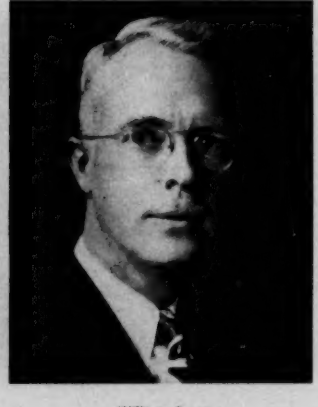
Dr. Charles R. Whittlesey



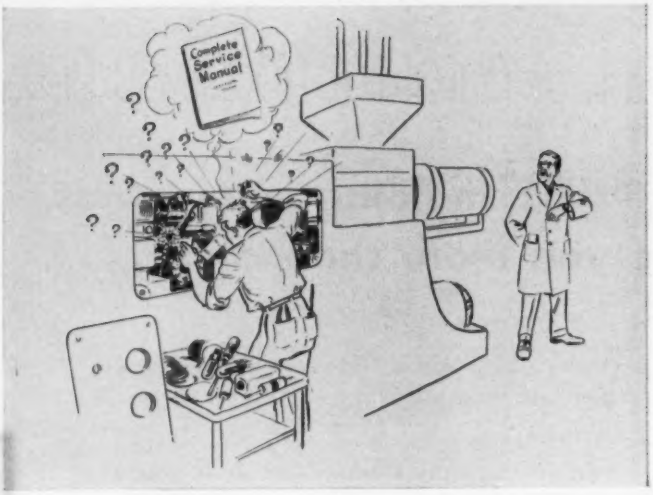
Dr. George W. Taylor



Dr. John R. Abersold



William Crean



Complete, easily understood service manuals on electronic temperature control instruments might greatly reduce time now lost while trying to locate an expert repairman

available what might be called special-purpose injection machines. (By contrast, one large manufacturer of equipment for molding thermosetting materials has available a specialized line of automatic molding equipment, and in addition has a line of specialty machines for automatically molding closures.)

As a result of the lack of special-purpose injection machines, J. H. DuBois, Plax Corp., Hartford, Conn., states that when the Plax Corp., decided to set up its own injection molding plant for producing a specialized type of polyethylene closure for squeezable bottles, it was found that no available injection molding machines could be satisfactorily adapted to this type of work. The company therefore decided that it was far more economical and sound from an engineering standpoint to design and build its own injection machines, especially suited to its requirements. The biggest problem was that it was necessary for all of the molds to be of the automatic unscrewing type. Due to the mechanism which was necessary in order to make such a mold operate efficiently, a comparatively large platen area was required, whereas the total injection capacity of the machine could be comparatively small.

As a result of this experience, Mr. DuBois feels not only that injection machines should be furnished with a range of platen area and clamping sizes, but also that some of the more common mechanized mold operations could be designed into the machine proper, and not of necessity be a basic part of the mold design. He foresees future machine design being aimed toward having external mechanisms fundamental to the press design as optional additional equipment.

THERMOPLASTIC FABRICATING

Mark L. Steiner, Steiner Plastics Mfg. Co., Inc., Glen Cove, L.I., N.Y., states that all the equipment which his company currently uses in the fabrication of thermoplastics is, of necessity, custom made. This made his company's capital expenditure for equipment too great—but it was the only way they could get into business. In the construction of equipment, he admits that errors added to the costs. All of this, according to Mr. Steiner, was brought about because no development work has been done exclusively on equipment used for fabrication of thermoplastics. He made a list of some of the equipment his company uses, and what he feels are the major faults of it.

Their presses are too slow for high production work. The ovens available have unequal heating and the heating areas are inaccessible, a distinct disadvantage when hanging and heating large sheets. The saws available as standard equipment must have specialized blades, and it has been necessary for Steiner Plastics to adjust the speeds to make them satisfactory in operation. The same complaint goes for drills. Mr. Steiner further states that the polishing lathes which they purchase have speeds that are either too slow or too fast, and this must be rectified in their own machine shop.

There are no commercially available routers that are satisfactory for thermoplastics, says Mr. Steiner. Those that are manufactured for woodworking must have their speed compensated before they can be used satisfactorily on thermoplastics.

In the case of handling equipment used in the Steiner plant, it is stated that the company has been unable to purchase satisfactory racks, wagons, etc.; even those which they have built or converted frequently cause breakage in the handling of parts.

With reference to cements, Mr. Steiner states that his company uses several different types, depending upon the application and the project at hand. He feels that some standardization should be possible so that possibly only one cement would be required for each type of material used.

His final statement, if followed by the plastics industry, would do more good than any other one single suggestion. He says: "Collaboration of fabricators on new techniques would be most helpful to all concerned."

COMPRESSION MOLDING

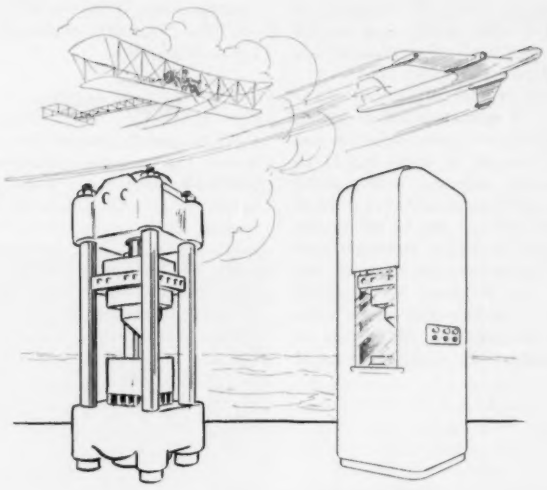
One of the largest compression molders in the world, Chicago Molded Products Corp., Chicago, Ill., has over 100 compression presses, ranging in size from 15 to 1500 tons. These presses vary widely in age today, but the company has recently installed several new units, some of them of medium capacity, but four of approximately 1500 tons capacity. The company is therefore in a very good position to criticize the eye appeal of the present-day compression press.

The appearance of a plant is certainly not enhanced by the appearance of present-day compression

(*Continued on p. 145*)

presses, and when a company attempts to modernize, appearance is of the utmost importance. Accordingly, Chicago Molded feels that streamlining of compression presses should well be given some attention. The company sees little difference in the appearance of the presses recently purchased over those purchased 30 years ago.

Chicago Molded would also like to have extensive development done on completely automatic control instruments for fast operations. These instruments should cover all operations, even including electronic preheating. As so many others have stated, this company also feels it would be worthwhile to devote time and attention to developing standardized arms and cams, which would handle basic types of mold actions. Under existing conditions, Chicago Molded states that it is forced to incorporate all such needed actions into the mold design itself.



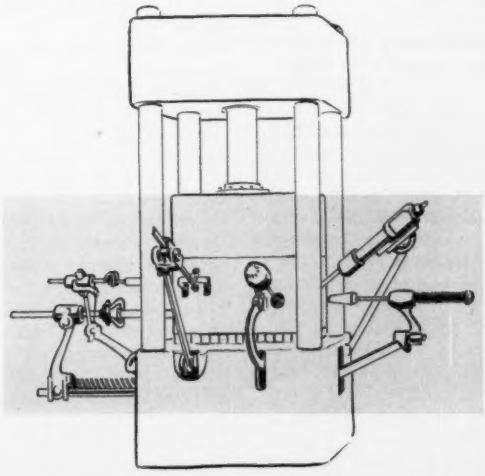
At least one molder's thinking about the compression press of the future encompasses sturdy construction without clumsiness; "streamlining" would sum it up in a word

Ideal Presses

Aiming at the ideal semi-automatic compression press, F. K. Davidson, Boonton Molding Co., Boonton, N.J., would like to have one which is more sturdily built than at present, yet not too clumsy. While he does not actually use the word, "streamlined," his thinking is obviously in that direction.

This ideal machine should be equipped with adequate push backs as well as with auxiliary knock-out cylinders, and Mr. Davidson would also like to see it incorporate an arrangement for attaching side rams for auxiliary work. In addition, the platens would be slotted or drilled and tapped for quick changing of molds. He would like to have the rams chrome plated, and the packing designed so that it could be easily removed. He recommends that the packing glands be bronze lined.

Because valving would be an important part of the ideal press, Mr. Davidson feels that valves should be positive and fast acting, yet should not be too complicated for the average maintenance man to service. The same suggestions are pointed at timing devices, and he feels that a combination of timing devices and automatic valving, adequate to control all required movements of the press, should be available as standard equipment.



Molders would like to see compression presses—and injection machines as well—provided with built-in means for doing jobs which now require auxiliary equipment

REINFORCED PLASTICS

Carl E. Holmes, Camfield Mfg. Co., Grand Haven, Mich., sees a great need for a press for molding reinforced plastics parts, which will be much more universal in operation than any obtainable today. For one thing, such a press should be easily adaptable to various daylight openings by raising or lowering the head. This might possibly be done by slotting the strain rods or other vertical press supports at various intervals. These slots—or whatever head-mounting devices are selected—should be numerous enough so that any thickness of mold, within reason, could be mounted in the press without the necessity of using spacer

bars or other fillers. Mr. Holmes felt that, for most applications in his company's field, the construction could be comparatively light.

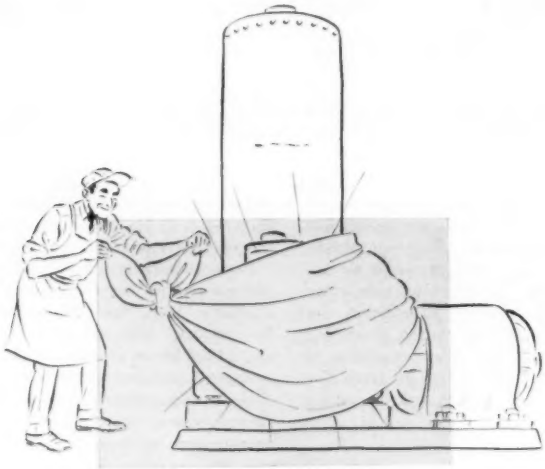
The air or hydraulic cylinders required for press operation should be available in various capacities and travels, but all of them should be universally adaptable to the press. These cylinders should have a travel speed of at least 350 to 400 in. per min., and should be equipped with throttling valves for varying this speed. In addition to throttling valves, a positive slow-down valve should be available. With such an arrangement, the mold could travel very fast until almost closed; then the positive slow-down would take control for the last inch or so of closing travel. It is desirable that this slow-down valve should have both a manual and an automatic control.

Preform Machines

In the field of preform machines, Mr. Holmes would like to see them more fully developed, with an eye to speeding up production of preforms. He suggested, for example, that the widths of the cutters which feed the chopped fibers into the plenum chamber should be increased. With such a change, wide sheets of mat could be fed through the cutters, resulting in a much faster feed of chopped fibers to the plenum chamber. This, in itself, would help to speed production.

QUALITY CONTROL

While quality control is a well-known tool in many industries, the plastics industry today makes practically no use of it. There are many reasons for this, but the two foremost appear to be: Ignorance of what quality control is, and the smug attitude that it may work for the other fellow but that it certainly has no place in this crazy plastics industry.



One group of molders points to hydraulic pumps as a source of annoying noise in the molding plant; they would like to see a method developed for muffling this racket

This latter reason has been forcefully proved wrong by at least one large custom molder. Since this issue of MODERN PLASTICS is pointed at the future—and since wide use of quality control in the plastics industry is still in the future—a brief summary of the advantages of quality control is given here. A complete article on quality control as applied by Consolidated Molded Products, Scranton, Pa., will be published in an early issue.

What it is Not

One molder, when discussing the use of this tool in his plant, first said: "I certainly can see no place for quality control in my business. Plastics are different. You've got to know plastics and more or less be familiar with their idiosyncracies; and there's certainly no mathematical tool which will help us." Later in the discussion, possibly in order to appear quite familiar with quality control, he suddenly remembered a large-volume job which had been running in his plant six days a week for many weeks. He then said: "Yes, but wait a minute—we do use quality control where it's needed," and he cited this particular job as an example.

It seems that the parts being produced were injection molded by the hundreds of thousands. The operators broke the parts from the sprues right at the machines and threw the parts into barrels. Then the shipping department merely closed the barrels and sent them out. To be sure that the quality of these parts was satisfactory, the foreman was instructed to take a handful out of the barrels at odd moments and look them over. "You see," the molder said, "We use quality control on the job and it's working very satisfactorily, because our customer does not return very many pieces to us." Suffice it to say that the procedure used in this plant is far from quality control.

Learning by Experience

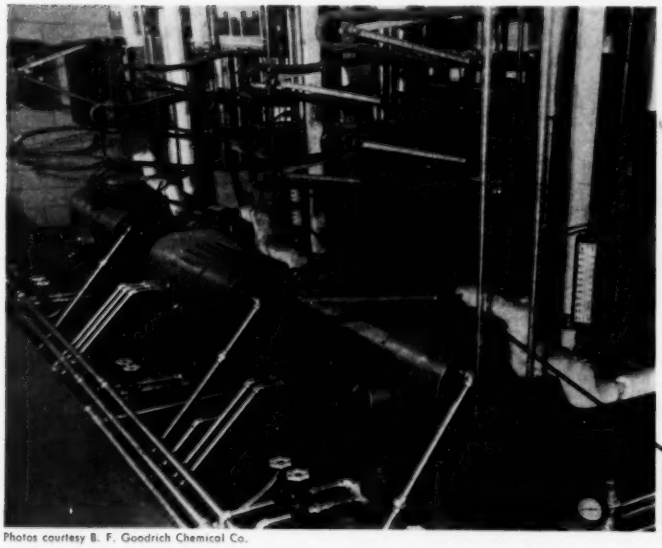
Another molder had a very sad experience on a high-production job for the Government during World War II. Externally threaded sleeve inserts with fairly close tolerances were molded in each one of the parts in question. During molding, the threaded inserts were held in threaded sleeves in the mold, and thermosetting material under very high pressure was transferred into the cavities. Of course, the inspection department had go and no-go gages to check the tolerance on these threaded sleeves. Every once in a while the inspector would get out his gages, gather a shot or two from the mold, and go through the usual procedure of checking them.

The only trouble was that the thread gages were not hardened and, unknown to the inspector, the gages wore and became larger. Unhappily, the threaded portions of the molds also wore; in fact, they wore about equally with the gages. After a period of time, the mold sleeves be-

(*Continued on p. 263*)

Tomorrow's Compression Plant?

Laboratory setup, with air-conditioned production room for operator comfort, demonstrates possibilities for layout of plants of the future



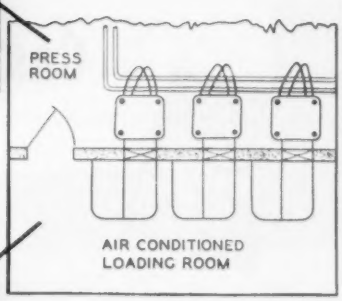
Photos courtesy B. F. Goodrich Chemical Co.

On one side of an insulated wall is a battery of compression presses (see drawing at the right) with all of the usual noise and heat confined to that one isolated area

On the other side of the wall is the loading room—clean, quiet, and air-conditioned. Presses are easily loaded, controlled, and unloaded through sliding panels in the wall

IT is doubtful whether most compression molders, unless pre-advised, would recognize the room in the lower photograph herewith as the production department of a compression molding plant. It has colorful tile walls, polished floors, perfect lighting, and air conditioning.

This room, in the B. F. Goodrich laboratories at Brecksville, Ohio, is so designed that easily raised and lowered panels in an insulated wall separating the presses themselves from the production room, open to permit loading and unloading of the presses. Electronic pre-heating equipment with elevating feeder platforms, and all controls and gages, are in the air conditioned room,



while the presses themselves are on the other side of the wall, out of sight, sound, and discomfort.

Safety devices on press opening are very complete. Control instruments are in plain view and easily kept spotless. There is a great incentive to press operators to keep themselves, their equipment and materials, immaculate.

While this is a laboratory setup, a great deal of research on employee comfort, time-motion standards, and production potentialities has been made possible by it; and established results indicate that it is entirely feasible in a good percentage of compression molding plants.

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TOMORROW'S PLASTICS TECHNOLOGY

by DR. HOWARD E. FRITZ†

THE two key questions facing plastics research chemists today are: a) Where are tomorrow's plastics going to come from? and b) What are we going to do with them? Bound up in these questions are such subsidiary factors as maintenance of economic balance between different raw material supplies, use or misuse of our natural resources, world trade balances, and the possible requirements of a more or less perpetual defense program.

While the research chemist in plastics is not directly concerned with, and is frequently not too aware of, the economic and even political significance of these subsidiary factors to his problem, the results of his efforts are generally conditioned by them, at least in present times.

This need not be true in the future.

So healthy and so versatile is the plastics industry, so broad is it in material sources, and so flexible in material use, that its materials sufficiency is practically guaranteed for the future, as long as there are men with imagination doing research on plastics, and men with foresight investing in plastics.

Not long ago, a research chemist, discussing a current shortage of dibasic acids, made the suggestion that the removal of pollution from several rivers in this country would provide us with all the maleic anhydride we would require, plus a lot of other valuable chemicals for use in plastics. That remark was not facetious. By the very step of preventing water pollution, we will save billions of pounds of source chemicals for plastics—and do it at a cost lower than that required for new production. If the natural gas industry will take steps to recover its naphthalene, which presently is released to the atmosphere, it will find a ready market. If the aluminum industry recovers fluorine; if the forest industries, the coal industries, the petroleum people, and others will continue the progressive chemical utilization of wastes, we need have little fear of future shortages of plastics raw materials.

Look to the Ocean

On new sources of plastics raw materials, it seems to me that we should be looking more intensively to the ocean, where untold trillions of unicellular bodies are working for us, concentrating an inexhaustible supply of chemicals. The organic and inorganic matter is in the sea, and all we have to do is collect it. Chlorine, fluorine, ethylene, and several other gases can be obtained cheaply by mining the ocean, and can thereby be used to increase our plastics supply, improve our plastics properties, and create still new plastics.

There is literally nothing that's cheaper to buy and handle than water. And aqueous solutions and dispersions lend themselves to treatment by bacteria—which is probably one of the cheaper ways of accomplishing any chemical conversion. I have no doubt that the biochemist will have a more and more important part to play in plastics technology tomorrow, because he will use algae and other bodies to accomplish conversions now made through expensive use of pressure and heat.

Following the ocean as a potential source of plastics comes natural gas, and gas is linked with petroleum. I remember in the early stages of World War II a national scare was caused by the expressed opinion of certain "experts" that supplies of petroleum within the United States would be exhausted within a decade. Today, we have more explored and proved petroleum sources than we shall be able to use in half a century, and more are proving up every day.

Tar Sands For Plastics

But suppose petroleum sources were limited. On the Arctic shores of Canada are "tar sands," which constitute one of the largest petroleum reserves and which have not even been tapped. It will take a lot of research, plus a lot of ingenuity, a lot of hard work, and a lot of money to convert these tar sands into plastics—but they are there if we want them.

Our natural gas reserves, as distinct from our petroleum reserves, are nebulous statistically, but obviously fantastic in quantity. All we have to do is make better use of our gases.

In our coal mines rest millions of tons of more chemicals for plastics. These probably can best be ob-

Plastics Futures

* Reg. U. S. Pat. Office.
† See p. 150.

THE AUTHOR

Dr. Howard E. Fritz, vice president of The B. F. Goodrich Co. in charge of that firm's research activities, heads up the Goodrich Research Center where his vision and executive ability are applied in fundamental research toward the development of better plastics and better rubbers, and wider applications of both.

Born in New Portage, Ohio, now the city of Barbarton, Dr. Fritz early in life showed talent for chemistry and for sports. Indeed, chemistry won his career attention by a small margin, because even in high school he was considered of major-league baseball caliber.

Graduating in 1914 with a degree of B.Sc. in chemical engineering from Ohio State University, Dr. Fritz qualified for the degree of Chemical Engineering in 1920, and received his Doctorate in 1921, joining the faculty of the University's Engineering School. In 1925 he went to The B. F. Goodrich Co. at Akron, and was placed in charge of a small department engaged in bonding rubber to metal. Under his leadership, the company pioneered in the adoption of rubber-lined steel products as chemical engineering tools for the handling of corrosive liquids.

In 1934, Dr. Fritz took over the direction of the development and sale of Koroseal, and in 1946 he was made vice president in charge of research.

tained by underground distillation of the coal and refining of the gas at shaft head. Even power from coal will one day be more economically obtained in that manner.

Today approximately 90% of industrial nitrogen is drawn from the air (an evolution of the past decade). This has been a factor in low-cost production of such important materials as nylon and acrylonitrile.

From sea and sand and oil and gas and coal—provided our technologists are not limited in imagination—we can obtain everything we can possibly need for tomorrow's plastics, no matter how high our production targets.

What New Plastics?

Given the plastics raw materials, what are we going to do with them? How are we going to improve present plastics? What new plastics are we going to require? What changes in methods of processing plastics can be forecast? The answers to all these questions depend largely on our projection of human needs.

Limiting our consideration of the subject to the United States alone, we get a new concept of our own objectives by a study of the recent U. S. census report. The population of this country is now more than 155 million, having nearly doubled in the past 50 years. All records were broken in 1951 for the birth of new babies—over 3.9 million. Conservatively, we will add to our population over 35 million people in the next 25 years. With no improvement in standards of living, we would still require more than a 20% increase in production of everything by 1977.

But one thing that makes this nation what it is, is the constant desire for "more" and "better" in everything. So our needs for plastics tomorrow will be practically as unlimited as our resources.

To fill these needs we'll have to have better plastics. We must have plastics with complete dimensional stability, with terrific heat resistance, with impact strength and abrasion resistance, and chemical resistance and electrical properties far superior to those we are now marketing.

Productivity Must Increase

The chief factor in our expanding economy will be the continuing importance of increased productivity. By 1960 it is estimated that the population of the United States will increase by 22 million while the increase in the normal employable age groups, 18 to 60, will be only 5 million, many of whom may be in the armed services. Productivity per worker must increase by 30%, or more, by 1960 unless our standard of living is to be substantially degraded. Such an increase can be attained only by providing more effective tools and greatly improved methods of production.

So the genesis of our approach to future needs (in excess of those that will come through population expansion) can well be the use of plastics to supersede materials which require a higher labor quotient in production and application. A case in point is piping and plumbing, where vibration-, impact-, and-heat-resistant weldable plastic tube will one day soon be used in place of hard-worked metals, the supply of which is diminishing.

The same approach would appear to be practical in the case of gutters and flashings, roofings, and other needs of the construction field. No metals used to date have been sufficiently stable in shape and dimension, sufficiently resistant to the elements, and sufficiently easy to fabricate in installation and to maintain. Plastics, which need no finishes to render them weather-resistant, which are light in weight for shipping and handling, which are strong and stable, can do a big job in that field.

Even in Bowling Alleys

Floors, walls, all other construction elements, whether or not they bear loads, are subject to the same approach. Even when heavy abuse and wear beyond the capabilities of plastics is involved, there will be markets. Take a bowling alley, for instance. At least once a year, and frequently oftener, a bowling alley made of the finest wood must be resurfaced with attendant "down-time" expense and loss of revenue. A plastics surfacing could be developed with adhesive pre-applied to the back, which could be peeled off and another roll applied in short order, to accomplish this resurfacing.

In the field of large moldings, we have barely begun, particularly in the automotive, refrigeration, furniture, and machinery fields. Where metals rust and dent, where expensive application of finishes is necessary, where every abuse means

(*Continued on p. 264*)

Resins as Finishing Agents

Use of urea- and melamine-formaldehyde resins in improving the quality or properties of paper, textiles, and leather†

by D. G. PATTERSON††, E. B. DETWILER†††, and T. J. SUEN†††

DURING recent years, a new and rapidly expanding field for the application of urea- and melamine-formaldehyde resins has been opened up. These resins have been employed in increasing quantities as "finishing" agents or additives to improve the qualities or rectify the shortcomings of some of the commercially and industrially important fibrous or amorphous materials. Some novel or remarkable effects have been brought about through the treatment with these resins; for instance, washability of woolens, wrinkle-resistance of rayon, and wet-strength of paper. The base materials being treated are usually processed, in one stage or another, in a water medium. For the sake of convenience and economy, the most suitable way to carry out the resin treatment is in aqueous solutions. Consequently, water-soluble resins predominate in this new field of application.

It must be emphasized that the so-called water-soluble urea and melamine resins are soluble in water only up to the time of application. After the resin is applied, it is usually subjected to a curing or setting step either at room temperature or at elevated temperatures. The cured resins are insoluble in water. Indeed, the usefulness of these water-soluble resins is mainly derived from the convertibility of the material from a soluble to an insoluble state.

Some other factors also contribute to the wide range of application of urea and melamine resins: they are colorless; they are polar in nature and therefore can be advantageously used with cellulosic and protein materials like paper, cotton, viscose rayon, wool, leather, etc.; and they are also available at a reasonable cost.

Treatment of Paper

Perhaps the most remarkable achievement in the paper industry during recent years is the manufacture of wet-strength paper. In ten years, wet-strength paper has grown from a rarity to over 400,000,000 lb. in 1949 (70)[1]. Although other materials or methods may be used where special effects are needed, by far the predominating process for obtaining wet-strength paper is treating the slush stock with a melamine or urea resin. Melamine resin used for this purpose is exclusively in the form of acid colloid (68). With ureas, both cationic and anionic resins are commonly used. The effect of the resin in increasing the wet-strength of paper arises primarily from an increase in adhesion between fibers (89), although the exact nature of the bond is still not clearly known (57).

When any base material is treated with a resin, obviously the following factors must be taken into consideration: retention of the resin by the base stock, cure of the resin, and extent and permanence of the effect achieved. In the field of wet-strength paper, each factor presents some interesting and special features.

It should be borne in mind that when paper is made from the slush stock, the pulp consistency is usually about 1% or less and that the resin applied amounts only to 1 to 5% of the dry weight of the pulp. The problem of retaining the resin from such a dilute solution can be appreciated. The retention of the resin by the pulp depends mainly on the following factors: molecular size of the resin; constitution and ionic character of the resin; presence of electrolytes; and nature of the pulp.

It has been quite well established in published literature that for melamine resin (29, 59), it is only when the degree of polymerization reaches a certain critical size that the resin will be effectively retained, as is clearly shown in Fig. 1 (59). The wet-strength curve is essentially of the same shape as the retention curve. For urea resins, the effect of polymer size on wet-strength and retention is practically the same as that for melamine resin. In Figs. 2 and 3 (see p. 154), the viscosity of the resin syrup is taken as a measure of the degree of polymerization (6).

It must be emphasized that the data presented in this article are only intended to show the effect of a certain variable. Different sets of data are not directly comparable, as generally there are a great number of factors involved and the test conditions are not necessarily the same when different sets of data are collected. For the present purpose of illustration, attention should be paid to the shape and trend of the curves rather than their exact positions.

No information on the exact compositions of the resins obtainable in the trade has been made available. A study of the influence of this factor, is, of course, not possible. However, the resins currently in use can be broadly classified as cationic and anionic, and the ionic character of

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* Reg. U. S. Pat. Office

† This article is a portion of a paper originally presented at the Symposium on Urea, Melamine, and Related Resins, American Chemical Society 119th National Meeting in Boston, Mass., on April 4, 1951, under the title, "Relationship of the Chemistry of Urea-Formaldehyde and Melamine-Formaldehyde Resins to Their Ultimate End Use. I. Aqueous Types."

†† 77 Bedford St., New York 14, N. Y.

††† Stamford Research Laboratories, American Cyanamid Co.

[1] Arabic numbers in parentheses link to references starting on page 272.

the resin plays an important role. In practical applications, the retention of cationic resins by the pulp can be effected without the use of any precipitating agent. It is generally assumed that as the cellulose fibers are negatively charged, the positively charged resin particles deposit on the pulp through electrical attraction and neutralization (29, 59, 110). For anionic urea resins, a precipitating agent, alum being the most commonly used, is necessary (37). According to the Hardy-Schulze rule (61), the aluminum ions apparently are responsible for precipitating the resin out of the solution.

By the same principle, it is also reasonable to expect that a cationic resin would be affected by anions present in the system. Sulfate ion, being the most common polyvalent anion encountered in papermaker's water, deserves special attention. For melamine resin, it has been found (69, 71) that the presence of a small amount of sulfate, 25 to 75 parts per million, before the resin is added, is actually beneficial. Higher sulfate concentrations tend to reduce both the retention and wet-strength. If the sulfate is added after the introduction of the resin, i.e., after the resin has deposited on the fibers, the effect is negligible. Cations apparently do not appreciably affect the melamine resin. The effect of electrolytes on both cationic and urea resins is more involved (71).

The retention of resin is influenced, not unexpectedly, by the nature of the pulp. It has been repeatedly reported (57, 71, 90), that the anionic urea resins work much better with unbleached pulp than with bleached pulp. On the other hand, the cationic melamine and urea resins are not markedly affected by the degree of bleaching. The reason for this difference is not clear, athough some explanation has been advanced on the ground of lignin content (57). Greater degree of refining, as a rule, is favorable to resin retention through the increase of surface area of the pulp.

Under the ordinary working conditions with 1 to 5% of resin applied based on the dry weight of the pulp, resin retention usually falls in the following ranges: melamine acid colloid 65 to 95%, anionic urea 30 to 60%, cationic ureas 45 to 75%. The wet-strength obtained amounts to 20 to 50% of the dry strength of the paper, as shown in Figs. 4 and 5 (6, 71), (see p. 156).

The cure of the resin generally depends on pH, temperature, and time. The pH of the slush stock in common practice is usually adjusted to a value of about 4.5. The heating applied is generally that supplied by the drying rolls during the drying of paper. Time and temperature, however, are interrelated. After aging, the final wet-strength is usually somewhat higher than the "off-machine" value. Even without any heating, resin-treated paper will develop substantial wet-strength after remaining at room temperature for a few days (57).

The resin-treated paper may gradually lose its wet strength if stored under humid and hot conditions. Generally, lower pH, higher temperature, and higher relative humidity favor the drop of wet-strength (70).

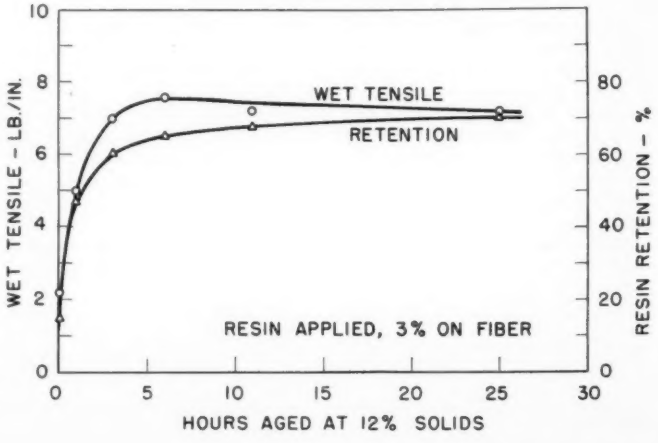
An excellent review of literature on wet-strength paper has been made by Collins and Adrian (24).

Treatment of Textiles

Crease Resistance and Shrinkage Control of Rayon and Cotton—Perhaps two of the most serious defects of viscose rayon fabrics are their failure to hold shape during wearing and their failure to hold dimensions during washing. Cotton fabrics suffer more or less the same shortcomings. The use of urea and melamine resins to effect crease resistance and shrinkage control on these fabrics, especially rayon, has greatly extended and improved their utility. It has been pointed out (105) that resin treatment did more to promote the use of spun rayon fabrics in shirtings, dresses, and sportswear than any other single factor.

The mechanism of crease-proofing is still a subject of considerable controversy. It has not been established whether the resin merely deposits interstitially in the fiber or the resin reacts with the cellulose molecules to form cross-linkages between them (20, 41). Recently, a composite view has been advanced by Cameron and Morton (20), saying that a small fraction of the resin applied is active in forming definite cross-bonds, while the remainder is deposited interstitially in the amorphous regions of the fiber and that the resin of both categories is effective in modifying fiber properties. It is fairly certain that the resin blocks off at least a part of the hydroxyl groups of the cellulose, as evidenced by the property changes exhibited by the resin-treated fabrics: lowered water absorption (95, 113); reduced swelling in, or imbibition of, water (41); resistance toward cuprammonium solution (56); and immunization against direct dyes (41). Cotton and rayon crease most readily under humid condi-

Fig. 1—Effect of degree of polymerization of melamine resin acid colloid on retention and wet strength



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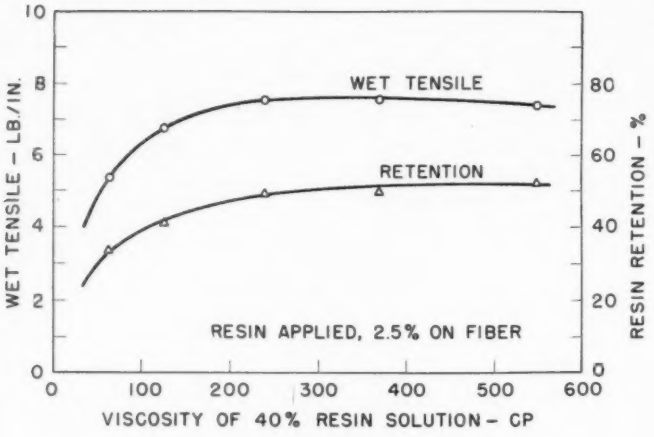


Fig. 2—Effect of degree of polymerization of cationic urea resin on retention and wet strength

tions (28). Their crease resistance would naturally be improved if they are rendered less susceptible to water. The shrinkage control of the fabrics through resin treatment is probably due to the bonding of fibers at points of contact with the resin as an adhesive.

The process of resin treatment usually consists of the following steps: 1) impregnation of the fabric in the resin solution of about 10 to 40% concentration catalyzed with a latent curing accelerator, usually an acid releasing compound; 2) squeezing by passing through mechanical rolls to regulate the amount of wet pick-up; 3) tenter drying; 4) curing of the resin, by heating the fabric in a hot air oven at 280 to 350° F. for up to several minutes; 5) washing and neutralization to remove any uncured resin, acid catalyst, and any other extraneous matter (95, 105).

The amount of resin applied commonly falls in the range of 5 to 10%, based on the weight of the dry fabric. Good shrinkage control usually can be achieved with 5 to 8% resin. But to get satisfactory crease resistance, 10% resin or higher is generally used. Typical results (6) are illustrated in Figs. 6, 7, and 8 (see pages 158-160).

It must again be emphasized that due to the large number of variables involved, such as source of textile fibers, constructions of the fabric, nature of the resin, method of application, and conditions for curing, test results are subject to considerable variations.

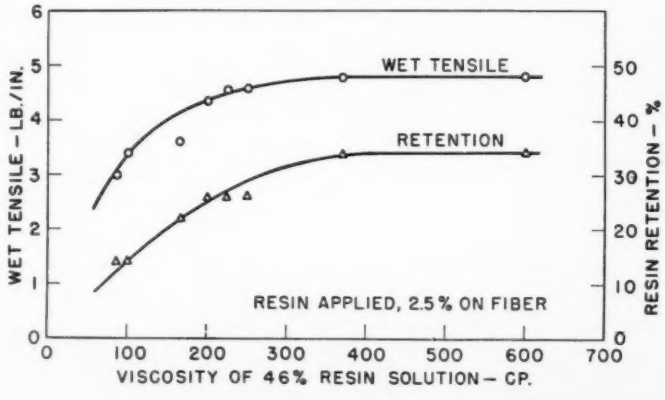
As is to be expected, the effectiveness of the treatment depends greatly on the nature of the resin. It has been shown that the crease resistance decreases as the degree of polymerization of the resin is increased (43, 95). As the polymer size grows, it becomes more and more difficult for the resin molecules to penetrate into the inside of the fiber to block the hydroxyl groups there. For crease-proofing, a monomeric resin is usually preferred. On the other hand, a polymeric resin tends to deposit itself on the surface of the fiber and bonds the neighboring fibers together. It is therefore effective for shrinkage control.

There are a number of secondary effects which must be considered in textile treatment. The question of "hand," although ill-defined, is ever present with textile materials. A polymeric resin due to its non-uniform distribution on the fiber, as a rule, imparts a more stiff or harsher hand than an equal amount of monomeric resin. For certain applications, e.g., curtains and draperies, where a crisp and stiff finish is desirable, polymeric resins may be advantageously used.

Reduction of various strength properties, e.g., tensile strength, tear strength, and abrasion resistance, is another effect usually associated with resin treatment. This is not, as often presumed, due to any appreciable degradation of cellulose by heat or acid during curing, but rather is caused by the decrease in extensibility and embrittlement of the fiber (41, 95). The extent of the loss of these strength properties depends somewhat upon the nature of the resin and the conditions of application (1).

When a urea or melamine resin is bleached during laundering, chlorine may be retained by the resin and on aging may tender and yellow the fabric. Chlorine retention may be minimized by changing the formulation of the resin, but its complete elimination has not been achieved. This problem can be best overcome

Fig. 3—Effect of degree of polymerization of anionic urea resin on retention and wet strength



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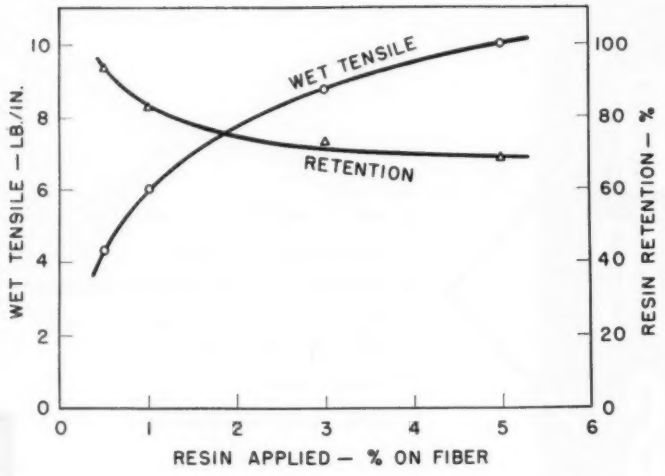
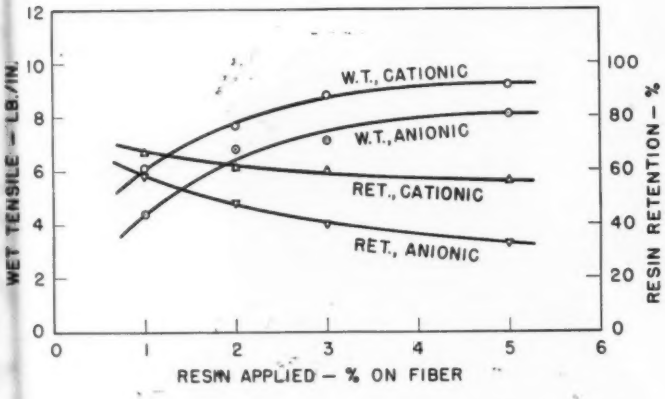


Fig. 4 (above)—Melamine resin acid colloid on bleached Canadian kraft pulp. Fig. 5 (below)—Urea resins on unbleached Canadian kraft pulp



by an after-treatment with an "anti-chlor," such as sodium bisulfite.

Textiles that have been treated with urea or melamine resins occasionally may develop an unpleasant fishy odor (86). This has been attributed to the formation of methylamines through reactions between formaldehyde and ammonium salts which are frequently used as curing accelerators. To prevent or remove the odor, it has been recommended either that the finished materials be given a weak sodium carbonate wash in the presence of an emulsifying agent, followed by a thorough rinsing (86), or that a suitable formaldehyde acceptor, such as urea, be used in the resin bath (39).

Finally, the color of dyed and resin-treated fabrics has, in most cases, an improved wash-fastness and a reduced tendency toward bleeding (108). This dye-fixing action also applies to woolens (31,33). Gas fading of acetate rayon is likewise retarded (65).

Shrinkage Control of Wool—The purpose in treating wool with resin is not so much to improve its crease resistance, for which wool is noteworthy, but to make it washable without excessive shrinking, matting, or felting. Two common processes are now in wide use to control the shrinkage of wool—chlorination and resin treatment. In the latter process, methylated methylolmelamine is now almost exclusively used (33, 50). The use of urea resins for this purpose is in general not very satisfactory, although it has been claimed recently that dibutyl ether of dimethylolurea is effective (3). The application procedure is more or less the same as that for cotton and rayon. The wool should be thoroughly cleaned before impregnation. The amount of resin applied is generally in the range of 5 to 10% of the woolen material. Some typical results (33) are shown in Fig. 9 (see p. 160). For comparison, the data with 20% of a urea resin are also included.

A more recent process recommends the use of melamine resin organic acid colloid (38, 40). For some woolens it is said to be more efficient than the monomeric methylated methylolmelamine. A pretreatment of the material with an alkaline peroxide solution would further improve the effectiveness. It is claimed that good results could be obtained even without heating. Processes combining chlorination and resin treatment have also been patented (44).

As is well known, the surface of the wool fibers is covered with scales all of which point toward the tip. As a consequence, the wool fiber moves with much less friction in the direction of its root than in the direction of the tip. The difference of the frictional properties in the two directions is generally regarded as the principal reason for the shrinkage of wool (62). During the laundering of the woolen material, the fibers tend to migrate and form a tightly tangled mass.

The control of shrinkage through the use of melamine resin is attributed to an effect of "spot-welding" of the fibers. The fibers are bonded to their neighbors at the points of contact, forming a network of fibers with restricted relative motion (101). Microscopical examinations revealed (66) that the resin is primarily deposited along the edges of the scales of the fibers. It has also been suggested that the resin treatment may equalize the frictional properties in the two directions of the fiber and therefore reduce the tendency of shrinkage. However, actual measurements of the directional frictional coefficients of untreated and resin-treated fibers indicate that the change of the coefficient is not great enough to account for the drastic reduction of shrink-

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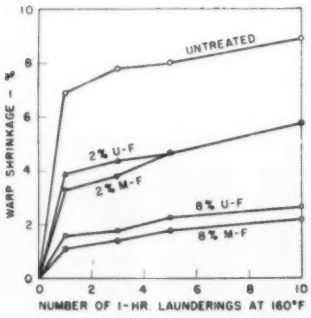


Fig. 6—The warp shrinkage of an 80 by 80 cotton percale

age by use of the resin treatment (3, 62, 101).

Durable Mechanical Effect of Textiles—The combination of resin treatment and mechanical manipulation has also been extensively used in textile finishing. One of the most important finishes of this type is durable glazed chintz (63, 95) applied to cotton sheeting. The fabric is impregnated with the resin and starch. After being dried, it is calendered in friction rolls to attain a highly glossy finish. When the resin is cured, the gloss will resist subsequent washing out.

Another example of this kind of combined effect is the embossed finish. Instead of using glazing rolls as above, the impregnated fabric is run through embossing rolls. The pattern is made durable by the setting of the resin (15, 95).

Durable Water Repellency of Textiles—In treating the textiles, if the urea or melamine resin is used in combination with a substance containing highly hydrophobic groups and capable of reacting with the resin or with the textile material, the fabric will become durably water-repellent, in addition to being crease- and shrink-resistant. Some of the notable hydrophobic ingredients are: methylol stearamide (104), formed by reacting stearamide and formaldehyde; octadecyloxymethylpyridinium chloride (14), formed by reacting stearyl alcohol, formaldehyde, and pyridine hydrochloride (87); and stearamidomethylpyridinium hydrochloride (35, 81), formed by reacting stearamide, formaldehyde, and pyridine hydrochloride (13). A process using melamine resin etherified with a high alcohol such as stearyl alcohol has also been patented.

An excellent review of the literature on this subject has been made by Schuyten and collaborators (92).

Treatment of Leather

"Resin tannage" (77) or "polymerization tannage" (54) has been defined as "a process in which a monomer, in aqueous solution, penetrates the hide and is polymerized in place, either spontaneously or with the aid of a catalyst." Lately, melamine resin has been used successfully as a tanning agent. It is applied to the skin essentially in the monomeric form and subsequently polymerized in the leather (31). In this connection it should be pointed out that the action of the melamine resin is rather different from that of the so-called "syntans." When these latter materials are used in treating leather, indications are that they undergo very little or no change in molecular size during or after the operation.

The following qualities of a resin are deemed desirable as a tanning agent (76): water-soluble; its solution should tolerate fair concentrations of salt; low molecular weight to facilitate its penetration into the skin uniformly and at a reasonable rate; readily polymerized at low temperatures and with catalysts that are not injurious to the skin; preferably colorless; stable on storage before application and inert after polymerization.

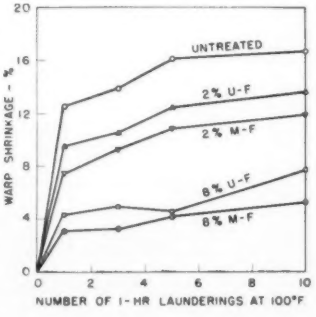
A melamine-formaldehyde condensate like trimethylolmelamine answers these requirements very well (26), with the possible exception that its storage stability may be short of ideal. Urea resins have also been considered as tanning materials (85, 106), but they have not attained any commercial importance (93). The treatment of leather with melamine resin involves the following steps: 1) *Preparation*—Pickled skin should preferably be neutralized. As melamine resin tends to polymerize and set under low pH conditions, it is not advisable to impregnate the skin with the resin at a pH below about 4, unless the stock is light and porous; 2) *Impregnation*—The stock is drummed in a dilute resin solution for several hours or longer. Auxiliary tanning agents, e.g., naphthalene sulfonate type syntans, may also be added in the solution. The amount of resin applied is generally 4 to 8% of the weight of the stock; 3) *Setting*—The liquor is acidified with dilute acid to a pH of 3 to 4. Drumming is continued for several hours or longer; and 4) *Finishing*—Neutralization and fatliquoring.

Chrome-tanned leather may also be treated with methylolmelamine. An upgraded product is obtained with increased fullness, fine grain, tightness, and lightening of color. The treatment is essentially the same as above, except that steps 2 and 3 are combined, with pH adjusted to 4 to 4.5. Naphthalene sulfonate type syntan is invariably used to insure better penetration.

The mechanism of the treatment is not yet established. Chemical reaction between the methylol groups and the protein matter of the leather is possible (76). But it is not clear whether the reaction actually occurs or the resin merely deposits as a filler.

This resin treatment is best used for manufacturing white leather. Although the surface can be whitened by bleaching and treating with pigments, the interior remains dark-colored. On the other hand, leathers tanned with melamine resin are white all the way through and they do not darken with age or exposure to sunlight.

Fig. 7—The warp shrinkage of medium weight viscose rayon suiting



Miscellaneous Applications

Moisture Proofing of Cellophane—If cellophane is to be used in direct contact with materials of high water-content, e.g., frozen food, it should be moisture-proofed. It is usually coated with a cellulose nitrate

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type of lacquer containing appreciable amounts of wax. However, the adhesion between the hydrophobic coating and the hydrophilic regenerated cellulose is very poor. In order to prevent the coating from peeling off, an "anchoring agent" must be applied between the cellophane and the coating. For this purpose, water-soluble urea-formaldehyde resins (21, 22, 112) and melamine resin acid colloid in aqueous solution (83) or in a polyhydric alcohol (82, 84) may be used.

Improved Water Resistance of Starch—Starch has been extensively used as an adhesive and as a binder for clay coatings on paper. The lack of water resistance is the main drawback for these applications. The addition of a urea resin (36) or a melamine resin (58, 88, 114) greatly improves the water resistance. The formation of ether linkages between the methylol groups of the resin and the hydroxyl groups of the starch has been suggested (7, 46).

Resin-Pulp Aggregates—Paper-base plastic materials, such as laminates and wall boards, have been in use for a long time. As a rule, in making these materials, the resin, either in the form of a solution or an emulsion, is applied to sheets of paper, with subsequent forming and curing. A novel process, mainly based on the ionic character of the system, has recently been developed (5) in which the resin can be directly applied to the slush stock. If a pulp is first treated with a small amount of a cationic melamine resin acid colloid, the latter is adsorbed by the negatively charged cellulose fibers, which in turn are rendered positively charged. The pulp is then treated with a resin dispersion or emulsion, e.g., polystyrene or polyethyl acrylate, of which the particles are negatively charged. When the resin particles are in contact with the pulp, they are electrically neutralized and deposit themselves on the fibers. Up to about 100% of the emulsified resin, based on the dry weight of the pulp, can be retained in this manner. The resin-pulp aggregate can be subsequently formed and cured. This new process may present far-reaching possibilities.

Water-Soluble U-F and M-F Resins—Descriptions of water-soluble amino-resins have appeared sporadically in technical journals and patent specifications. To the best of the authors' knowledge, there has been no general review of this class of resins available. A survey of the water-soluble urea and melamine resins now obtainable seems warranted. It should be borne in mind, however, that as new developments in this field are progressing by leaps and bounds, no survey can hope to remain up-to-date for any length of time.

Water-soluble resins are usually prepared according to one of the following two schemes: 1) control of reaction conditions so that the degree of polymerization of the product is kept low, essentially in the monomeric stage; 2) introduction of hydrophilic groups into the resin molecules.

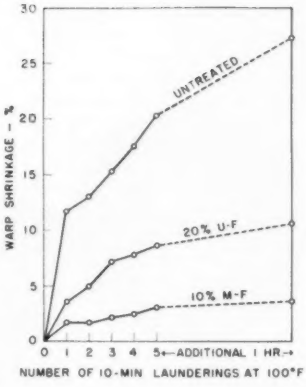


Fig. 9—The warp shrinkage of 8-oz. women's wear flannel

Various urea- and melamine-formaldehyde condensates in monomeric state have been made, and some of them are indeed commercially available. As a rule, these compounds are unstable and tend to polymerize further. In order to keep the products usable for any reasonable length of time, they must be stored in dry and cold conditions or with other precautions.

The procedure for preparing monomethylolurea (I) and dimethylolurea (II) has long been known (34).

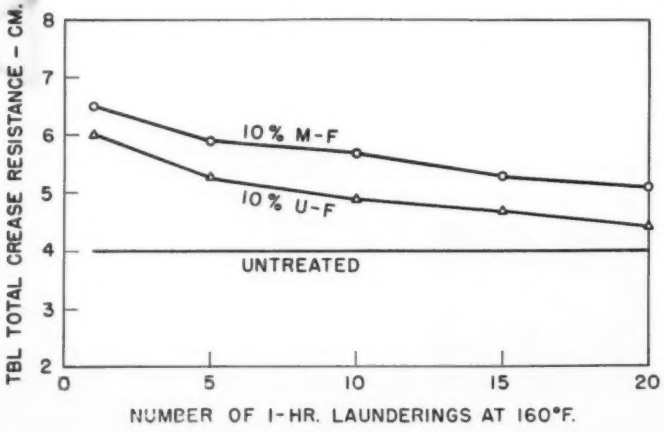
$$H_2N-\overset{\overset{O}{\|}}{C}-NH-CH_2OH \quad (I)$$

$$HO-CH_2-NH-\overset{\overset{O}{\|}}{C}-NH-CH_2-OH \quad (II)$$

They can be prepared easily by reacting urea with the respective number of mols of formaldehyde at low temperature and at a pH of 7 to 8. Both monomethylolurea and dimethylolurea are soluble in water. Of course, monomethylolurea upon further reaction does not form a thermosetting product or a three-dimensional polymer. Commercial methylolurea type condensates usually have a formaldehyde/urea ratio of greater than 1 but not greater than 2.

Another type of monomeric urea-formaldehyde condensate, like N,N'-bis(methoxymethyl)uron (IV) or N,N'-dimethyluron (V), has been

Fig. 8—The crease resistance of an 80 by 80 cotton percale



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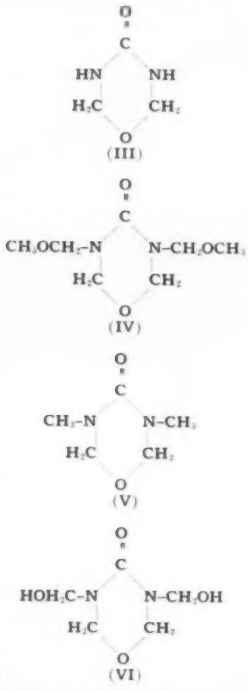
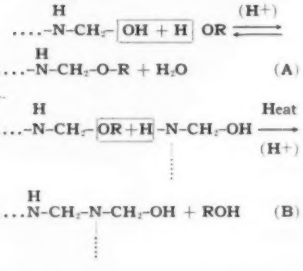
described by Kadowaki (51, 72), who coined the name of "Uron" for the ring (III). N,N'-dimethyloluron (VI) was not isolated by Kadowaki, but its existence has been claimed by Kvalnes and Chance (55).



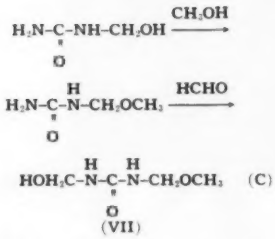
Methylolmelamines apparently exist in two modifications, crystalline and amorphous. Crystalline hexamethylolmelamine has been isolated (42). A series of compounds, di-, tri-, tetra-, penta-, and hexamethylolmelamines, possibly not of the highest purity, have been reported (33). They can be prepared by heating melamine with the appropriate amount of aqueous formaldehyde at a pH of about 8.0 to a temperature of 70 to 80°C. and quickly cooling to room temperature to induce crystallization. These compounds are only sparingly soluble in cold water. The amorphous methylolmelamines may be prepared by reacting melamine and the appropriate amount of aqueous formaldehyde at about 80°C. and at a pH of 9.0 to 9.5 until a clear syrup is obtained and immediately spray-drying the solution to a powdery material (74). Products with formaldehyde melamine ratios of 2 to 6 have been described. They are readily soluble in water at ordinary temperatures. However, they are highly hygroscopic. When in contact with humid air or a small amount of water, these compounds tend to revert to the crystalline type and become difficultly soluble.

If the active methylol groups of a urea-formaldehyde or melamine-formaldehyde condensate, which are responsible for polymerization, are entirely or partly blocked, the stability of these compounds will naturally be greatly enhanced. The blocking, however, must be temporary in nature. Under the conditions of the final cure of the resin, further polymerization must still be possible. These requirements can be met by reacting the methylol compounds with an alcohol and converting them into ethers, as shown in equation A, (109). For water-soluble products, methyl alcohol is the most suitable alkylating agent.



The methylated compounds are very stable at ordinary temperatures. When they are heated in the presence of an acidic curing catalyst, they will undergo further condensation with the removal of alcohol, as shown in equation B (33). It is quite probable that a part of the alcohol remains in combined form in the cured resin (96).

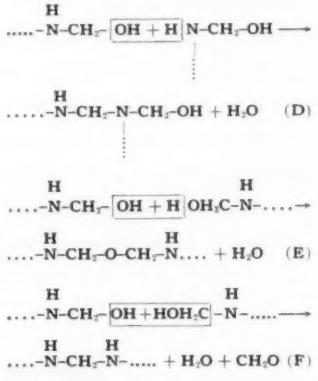
Dimethyl ether of dimethylolurea, or bis(methoxymethyl)urea, can be conveniently prepared by reacting dimethylolurea with an excess of methanol in the presence of an acid condensing catalyst (25). After neutralization and evaporation, the compound can be crystallized. It is freely soluble in water. The preparation of the same compound under alkaline conditions has also been claimed (98). The monomethyl ether of dimethylolurea (VII) can be prepared by first reacting monomethylolurea with methanol to obtain the monomethoxymethylurea, which is then reacted with another mol of formaldehyde, as in equation C (99).



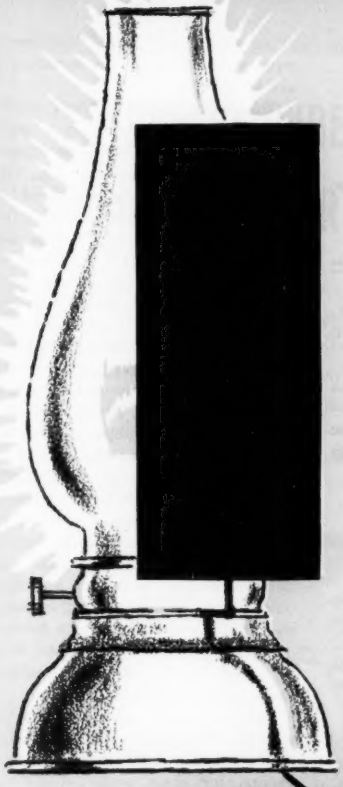
Like the urea derivatives, methyl ethers of methylolmelamines are usually prepared by reacting the methylolmelamine under controlled acid conditions, followed by neutralization and vacuum concentration (4, 23, 33, 107). Although crystalline hexakis(methoxymethyl) melamine has been reported (42), the methylated products with formaldehyde/melamine ratios from 2 to 6 obtained with the above procedure are usually viscous liquids or glass-like solids, with 50 to 90% of the methylol groups etherified. They are essentially monomeric products, very stable, and infinitely soluble in water at ordinary temperatures.

It should be mentioned that while methylol derivatives of urea and melamine resinify readily in aqueous acid solutions, during the preparation of the methylated products the presence of a large amount of methanol retards polymerization and favors ether formation (33).

When methylolurea or methylolmelamine condense further, the following reactions may occur (33, 56):



It is obvious that as more and more of the hydrophilic OH groups are eliminated, the resulting compound assumes an increasingly hydrophobic character and finally becomes water insoluble. For certain



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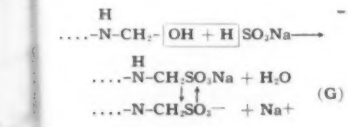
applications that have been described earlier, a fairly high degree of polymerization is necessary. In order to render the polymer water-soluble, a logical approach is to incorporate hydrophilic groups into the polymer molecules.

As is well known, there are three types of hydrophilic groups available — anionic, cationic, and nonionic. All of them can be used to modify the resin to achieve water solubility.

The most common anionic urea resin now commercially available is sodium bisulfite-modified (7, 11, 18, 102). By reacting urea, formaldehyde, and sodium bisulfite first under alkaline conditions and then under acid conditions, a water-soluble, viscous resin is obtained. Presumably, the reaction proceeds according to equation G. In aqueous solution, the product ionizes and the resin ions bear negative charges. Melamine - formaldehyde - bisulfite resin can be prepared in a similar way but at a higher pH (11, 75).



(G)

The amount of bisulfite used is sufficient to react with only a small fraction of the methylol groups, leaving the rest active and capable of further condensation. Sulfur dioxide or sulfurous acid may also be employed if the product is to be used under acid conditions (67).

The other modifiers that may be used to make anionic amino resins are listed below:

Sodium salt of amino acid (for urea-formaldehyde or melamine-formaldehyde resins):

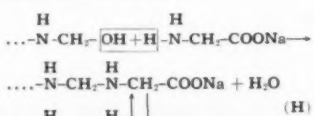
- Amino-carboxylate, e.g., glycinate, $H_2N–CH_2–COONa$ (27, 52, 99).
- Aliphatic aminosulfonate, e.g., taurine, $H_2N–CH_2CH_2SO_3Na$ (27).
- Aromatic aminosulfonate, e.g., sulfanilate, $H_2N–C_6H_4SO_3Na$ (27, 52, 80).

Sodium salt of hydroxy acids (for urea-formaldehyde resins):

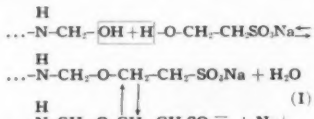
- Hydroxycarboxylate, e.g., lactate (2).
- Hydroxysulfonate, e.g., isetheionate, $HO–CH_2CH_2SO_3Na$ (10).
- Formaldehyde sulfoxylate, $HO–CH_2SO_2Na$ (19).

Diglycolate (60).

The reactions are illustrated by equations H and I.

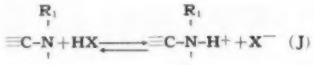


(H)



(I)

The cationic resins acquire the positive charges through the presence in the resin molecule of a basic nitrogen group, in combination with an acid,



(J)

where R_1 and R_2 are either hydrogen or low alkyl groups, and HX is an acid.

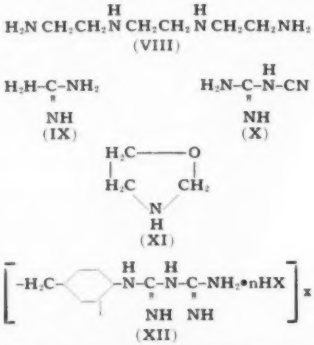
To make cationic urea resins, the following types of compound have been mentioned:

Polyamino compounds

- Polyalkylenepolyamine, e.g., triethylenetetramine (VIII), (53), tetraethylenepentamine (103, 112).
- Guanidine (IX), (9, 21, 103, 112).
- Dicyandiamide (X), (103).

Hydroxylamines

- Dimethylaminoethanol (8).
- Diethanolamine (103).
- Oxazolidine (XI), (73).
- Polyphenylbiguanide (XII), which is made from aniline, dicyandiamide, formaldehyde, and an acid (32).

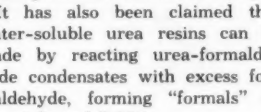


When they react with urea-formaldehyde condensate in the presence of an acid, it is believed that resins with radicals shown in equation J are formed.

The formation of cationic melamine resin is achieved in a quite unique manner. When a melamine-formaldehyde condensate, e.g., trimethylolmelamine, is dissolved in an aqueous solution of an acid, it reacts with the acid to form a salt which dissociates (111). At the same time, it gradually polymerizes. Such a polymer is now commonly called "melamine resin acid colloid." It is rather stable and infinitely soluble in water. Its eventual gelation may be retarded by dilution. Dixon and his co-workers (29, 30) made a detailed study of the physico-chemical characteristics of the acid colloid of trimethylolmelamine in hydrochloric acid, and found that the triazine rings, 10 to 20 in number in ordinary acid colloid, are lined up in such a way as to resemble a stack of doughnuts. Both hydrogen ions and chloride ions are bound to the molecule, but the number of the former is in excess of that of the latter, thus resulting in a net free positive charge on the polymer.

The non-ionic urea-formaldehyde and melamine-formaldehyde resins depend on the presence of hydroxyl groups for their water solubility. They are usually prepared by reacting the resin-forming ingredients with ethylene glycol, diethylene glycol, glycerol, and the like (47, 48, 49, 64). As the etherification reaction is reversible, part of the alcohol remains uncondensed and acts as a solvent. Generally, liquid amino-resins have a better storage stability in the presence of an alcohol (91).

It has also been claimed that water-soluble urea resins can be made by reacting urea-formaldehyde condensates with excess formaldehyde, forming "formals" or "hemi-formals" (78):



(K)

The use of a polyhydric phenol, e.g., resorcinol, to solubilize urea resins has also been described (12). As these compounds are slightly acidic, the resins thus modified may also be classified as weakly anionic.

In connection with water-soluble amino resins, it should be mentioned that another very interesting

(*Continued on p. 270*)

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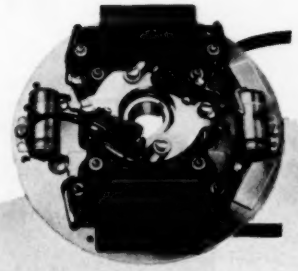

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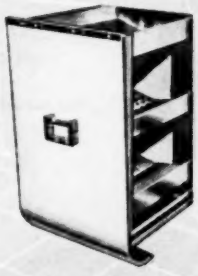

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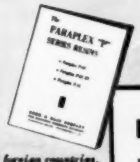

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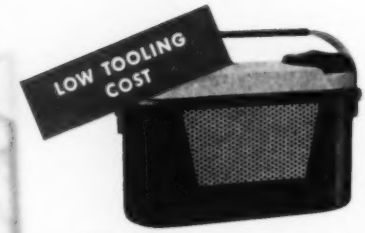

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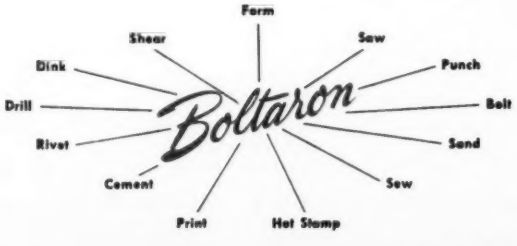

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% Elongation at Maximum Tensile	70	3
Ultimate Strength – Tension (p. s. i.)	70	4400
Young's Modulus in Tension	70	250,000
Impact Strength (Izod)	70	15
(ft. lbs./in. notch)		
(ft. lbs./in. notch)	20	4
(ft. lbs./in. notch)	0	1

CHEMICAL RESISTANCE:	Temp. °F.	Value
Water Absorption (24 hr. immersion)	70	0.5
10% Sulfuric Acid (7 days)	70	0.3
3% Sulfuric Acid (7 days)	70	0.5
10% Sodium Hydroxide	70	0.3
1% Sodium Hydroxide	70	0.5
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PLASTICS DIGEST*

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General

ETHYLENE CHEMICALS—THE NEXT DECADE. W. E. Kuhn and J. W. Hutcheson. Chem. Week *69*, 19-34 (Sept. 29, 1951). Statistics on the production of many types of ethylene chemicals are presented and the ramifications of this segment of the chemicals and plastics industry are described.

MARKET PROSPECTS IN SWEDEN. Brit. Plastics *24*, 348-9 (Oct. 1951). The market prospects in Sweden for raw materials for making resins, plastics, plasticizers, and solvents are discussed with respect to specific items in the above categories. The United Kingdom is the largest supplier to Sweden of these materials.

EXPORTS AND IMPORTS OF PLASTICS MATERIALS. Brit. Plastics *24*, 364-5 (Oct. 1951). Import and export data on plastic materials for January to July 1951 for the United Kingdom are reported.

Materials

ALKYD RESINS. D. T. Moore. Ind. Eng. Chem. *43*, 2348-55 (Oct. 1951). In order to assist the protective coatings industry to select raw materials for particular applications, an attempt is being made to correlate certain properties of alkyd resins with the composition of the modifying monobasic acids. Investigations dealing with fatty acids containing only substantially completely nonconjugated unsaturation show that each parent oil used leads to a separate drying time curve (the curves are similar in shape); hardness is directly related to polyenoic acid content, without regard to the linoleic-linolenic ratio; and relative after-yellowing can be predicted quantitatively where the composition of the fatty acids is known. With formulations containing substantial proportions of conjugated unsaturation, hyperbolic curves generally define the effect of polyenoic acid variation on drying time; increase in conjugated unsaturation, up to about one half of the total unsaturation, hastens the drying process; the hardness of the finished alkyd is predictable on the basis of fatty acid composition; changes in the ratio between dienoic and trienoic acids, or between conjugated and nonconjugated unsaturation, do not affect hardness, if the total polyenoic acid content is unchanged; the relative degree of yellowing of white enamels, after a particular interval of time, is predictable on the basis of fatty acid composition; and the progressive development of yellowing is related to the duration of the test by a logarithmic relationship.

ETHYL CELLULOSE AS A MOLDING MATERIAL. E. E. Halls. Plastics (London) *16*, 260-1 (Sept. 1951). The properties of ethyl cellulose plastic molding materials are described briefly.

STABILIZATION OF POLYVINYL-CHLORIDE-TYPE PLASTICS. J. G. Hendricks and E. L. White. Ind. Eng. Chem. *43*, 2335-8 (Oct. 1951). The quality and serviceability of polyvinyl-chloride-type plastics are functions of the constituents of the plastic. Numerous stabilizers are available for use in assisting to achieve and retain desirable properties. The purpose of this paper is to determine the heat stability and weathering resistance imparted by these stabilizers in a basic formulation and to indicate the effect of plasticizer and resin types on these properties. The results of tests on 91 individual stabilizers are reported. Stabilizer effectiveness ranges from nil to varying degree of resistance to heat or weathering or combinations of both. Stabilizing action depends, to a first approximation, on the kind of metal in the stabilizer, when present, thus providing a convenient method of classification. Plasticizer type, based on chemical structure and ease of oxidation, also exerts a major influence on both heat stability and weathering resistance. Resin type is of particular importance in weathering. The fact that stabilizers, plasticizers, and resins all exert great influence on the stability of a vinyl plastic and that these materials may be readily classified according to general stability provides a greatly simplified and highly useful approach to the compounding of vinyl plastics of desired characteristics.

CHLORINATED POLYPHENYLS AND THEIR APPLICATIONS IN PVC COMPOSITIONS AND IN SURFACE COATINGS. Brit. Plastics *24*, 390-2 (Nov. 1951). The effects produced by using chlorinated diphenyls in the formulation of polyvinyl chloride compositions are reported. Chlorinated diphenyls contribute to reduction in costs, reduction in flammability, improvement in electrical properties, good toughness and strength with satisfactory flexibility and hand, resistance to fungi and termites, and improvement in pigment grinding and dispersion. Data on volatility, heat stability, light stability, and toxicity are reported. Formulations and applications are discussed.

NEW BRITISH STANDARDS FOR PVC PRODUCTS. Brit. Plastics *24*, 374-5 (Nov. 1951). A new British Standard, B.S. 1763, for "Flexible polyvinyl chloride film and sheeting (unsupported)" is described. Two types are described. Type I is a general-purpose film in the range 4 to 15 mils thick. Type II is the same as Type I except that it is printed. Two other specifications based on B.S. 1763 are also described. B.S. 1774 is for "Rainwear from polyvinyl chloride sheeting: Part I—Fabrication." B.S. 1776 is for "The fabrication of lightweight articles (other than rainwear) from polyvinyl chloride sheeting."

Molding and Fabricating

ELECTROSTATIC IGNITIBILITY OF DUST CLOUDS AND POWDERS. A. R. Boyle and F. J. Llewellyn. J. Soc. Chem. Ind. *69*, 173-81 (June 1950). The electrostatic ignitibilities of a number of varied substances in the form of dust clouds or powders were determined under a variety of conditions; the work is divided into three parts. Results for dust clouds of magnesium, aluminum, ferromanganese, zinc, and silicon are

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CENTRIFUGAL FORMING OF ACRYLIC SHEET. Brit. Plastics *24*, 350-1 (Oct. 1951). A centrifugal mechanism for the forming of aircraft canopies from transparent acrylic plastic sheet is described. The heated acrylic plastic sheet is clamped in a jig the base of which conforms to the base contour of the canopy. The jig is then rotated about a central axis. The required contours are produced by varying the speed of rotation and the distance of either end of the jig from the axis of rotation.

CALENDERING OF PLASTIC MATERIALS. R. E. Gaskell. J. Applied Mechanics *17*, 334-6 (Sept. 1950). Several mathematical studies of the rolling of steel and aluminum, solids with definite yield points, have been made. In those studies, any shear stress beyond the yield stress is neglected. The plastic materials handled by other industries do not often have a definite yield point, or, after yielding they may behave more like liquids of very high and usually variable viscosity. Shear stress beyond the yield point, due to viscosity, cannot be neglected. A mathematical description of the calendering process for plastic materials is developed on this basis.

Applications

VISCOSITY INDEX IMPROVERS FOR LUBRICATING OILS. W. S. Port, J. W. O'Brien, J. E. Hansen, and D. Swern. Ind. Eng. Chem. *43*, 2105-7 (Sept. 1951). Polymers and copolymers of vinyl esters of the long-chain fatty acids are of potential commercial interest because the monomers can be easily prepared in good yield from inexpensive and readily available raw materials. As part of a general program of preparation and evaluation these polymers and copolymers were tested as viscosity index improvers for lubricating oils. Polyvinyl palmitate, polyvinyl caprylate, and copolymers of vinyl palmitate with vinyl acetate are effective viscosity index improvers for lubricating oils. The improvement caused by the copolymers increases with increased vinyl acetate content. The solubility of the copolymers in lubricating oils decreases as the vinyl acetate content increases; an optimum effect is obtained with a copolymer containing about 25 mole percent of vinyl palmitate. In general, the viscosity index-improving effect of a polymer or copolymer in a lubricating oil is enhanced as the solubility of the polymer decreases and its concentration increases.

DESIGN FACTORS IN BLOW-MOLDED PLASTIC BOTTLES. J. H. Parliman. Modern Packaging *25*, 132-4, 190 (Nov. 1951). Problems involved in the design of plastic closures, liners and spray fittings for bottles, and in the surface decoration of plastic bottles are discussed.

LAMINATES FOR RAILWAYS. Brit. Plastics *24*, 368-71 (Nov. 1951). The use of plastics laminates in the construction of British railway passenger cars and diners is described. They are used for ceilings, bulkheads, walls, and table tops.

DRUGS IN PLASTICS. Modern Packaging *25*, 110-11 (Nov. 1951). Drug samples for distribution to physicians are packaged in containers formed from cellulose acetate plastic sheet and molded from styrene and ethylene plastics.

COHESIVE PAPERS. Modern Packaging *25*, 82-4 (Nov. 1951). Applications of cohesive papers, which adhere only to themselves and require only the application of pressure for bonding, in the packaging field are described. Adhesive is a specially compounded rubber derivative.

AIRCRAFT PLASTICS STRUCTURES. H. W. Hall and J. E. Gordon. Aircraft Production *13*, 211-14 (July 1951). A review of the materials and molding processes used in transparent aircraft structures is presented here.

EMBEDDING IN CAST RESINS. Plastics (London) *16*, 249-50 (Sept. 1951). The embedding of biological specimens in acrylic and polyester resins is described.

Properties

WHAT IS THE EQUIPMENT DESIGNER'S EXPERIENCE WITH DIELECTRICS? L. E. Sieffert, Elec. Manufacturing *48*, 119-21, 240, 242, 244 (Dec. 1951). Mechanical, electrical, and aging characteristics of flexible vinyl plastic tubing and silicone-glass laminates used in the construction of electrical equipment are described.

MACROMOLECULES CONTAINING LONG-RANGE PERIODICITIES. H. Mark. Record of Chem. Progress *12*, 139-46 (Summer issue 1951). The effects of long-range periodicities, of the order of 150 A, caused by the presence of a different group or substituent on a macromolecule, are considered. Attempts to make such products by substitution and by grafting are reviewed in this article.

PLASTICS EVALUATION BY SOFT X-RAYS. D. T. O'Connor and E. W. Eagleson. Non-Destructive Testing *9*, 15-22 (Summer 1950). Finished plastic items may have a perfect exterior appearance, yet contain flaws as shown by x-ray examination, which definitely cause irregular operation. This investigation is concerned chiefly with the development of molding techniques for a formulation of northern kraft wood pulp filler, a thermosetting resin binder, and a small percentage of latex emulsion. The interpretation of x-ray films of plastic cylinders is established with adequate identification of fissures, cracks, inclusions, mechanical separation, and, also, latex segregation.

TEMPERATURE SENSITIVITY OF PLASTICIZER-POLYMER SYSTEMS. A. Dyson. J. Soc. Chem. Ind. *69*, 205 (July 1950). The mechanical properties of a plasticized polymer are generally admitted to depend to a large extent on the viscosity of the plasticizer. It is shown that the temperature dependence of the viscosity of a plasticizer may be less than that of a polymer, and that the addition of a plasticizer to a polymer may reduce the sensitivity of the system. This conclusion is in opposition to a com-

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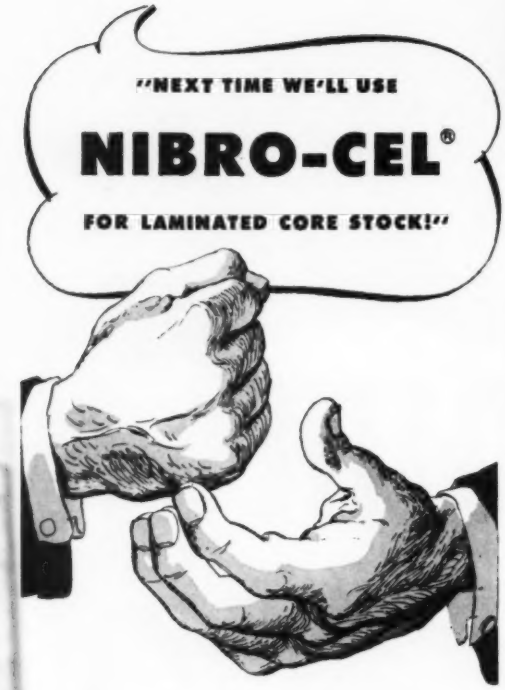

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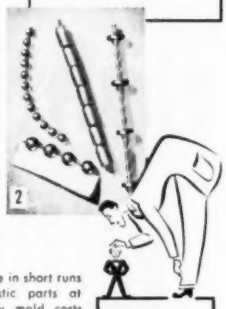

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mon interpretation of the viscosity theory of plasticizer action, but is shown to be in accordance with experimentation.

FABRIC-BASE PLASTICS. II. INTERLAMINAR STRENGTH. K. W. Pepper and J. R. Riddell. J. Soc. Chem. Ind. *69*, 195-201 (1950). The strength of laminated plastics derives mainly from the fibrous reinforcement, but the fibers, being arranged in layers, cannot contribute to the interlaminar strength. The consequent weakness is revealed by a low cross-tensile strength and a low shear strength parallel to the laminations. Certain variables in the preparation of phenolic-bonded laminates are shown not to be critical, but interlaminar strength, in common with other properties of reinforced plastics, is sensitive to variations in the moisture content of the impregnated reinforcement at the time of pressing. The interlaminar strength of voidless products made from a phenol-formaldehyde resin in alcoholic solution with absorbent paper or scoured fabrics is substantially constant over the range of resin content likely to be used in practice. With both types of reinforcement, the limiting strength of the resin itself is approached, but not fully attained, at a resin content of 27 percent. There is no essential difference between the strengths obtained with scoured fabrics or absorbent paper. The beneficial effects of desizing and scouring are conclusively proved. While the scouring process used does not appear to be highly critical, desizing by itself is not an adequate pre-treatment. Absence of twist in the threads of a fabric does not contribute to higher interlaminar strength.

DIELECTRIC BREAKDOWN PROPERTIES OF THERMOSETTING LAMINATES. N. A. Skow. Elec. Manuf. *48*, 110-13, 286 (Nov. 1951). The dielectric strength and dielectric fatigue properties of seven grades of laminated thermosetting plastics were determined over a range of temperature and relative humidities likely to be encountered in service.

A "COLOR INDEX" FOR FLOOR TILE RESINS. B. A. Reeves. ASTM Bulletin No. 178, 62-4 (Dec. 1951). The uncertainties involved in visual rating of floor tile resins and other binder components according to the

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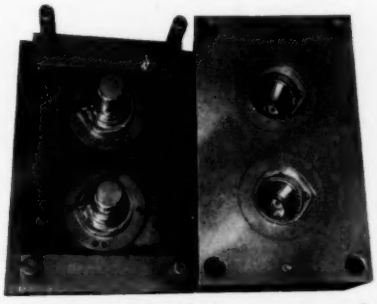

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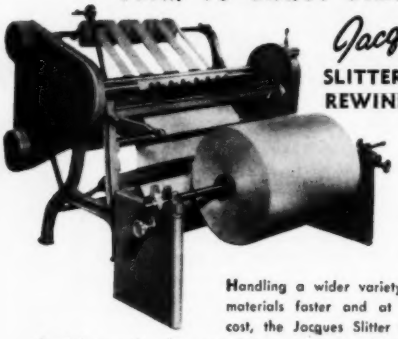
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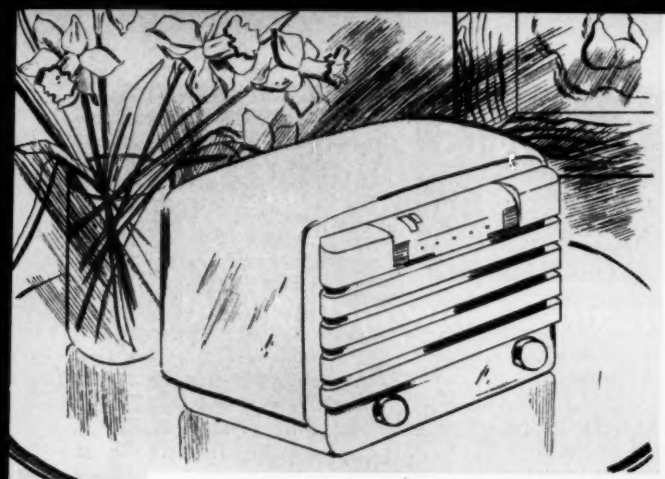
coal-tar resin color system can be resolved by the use of a photoelectric photometer. A suitable and inexpensive instrument for this purpose is the General Electric Luximeter. Other photoelectric photometers are equally suitable if equipped with the proper filter. Use of an instrument frequently results in a darker rating than that obtained by visual inspection. The instrumental rating is considered to be much more reliable because the average observer is unable to separate completely the effects of hue and intensity.

CREEP TEST METHODS FOR DETERMINING CRACKING SENSITIVITY OF POLYETHYLENE POLYMERS. W. C. Ellis and J. D. Cummings. ASTM Bulletin No. 178, 47-50 (Dec. 1951). Two test methods for determining the cracking sensitivity of polyethylene polymers are described: one utilizing strip-tension specimens is particularly applicable for appraisal of materials in an experimental program; the other using internal pressure in a pipe sample is applicable to polymers manufactured in the form of tubes. The methods of stressing produce polyaxial or biaxial stress required for cracking to occur. In the pipe sample, no artificial notching is necessary and the biaxial stress can be calculated. Both tests are modifications of conventional creep test methods. Polyethylene polymers of different plasticity numbers were rated as to crack resistance. The tests show that sensitivity to cracking in the presence of an active agent decreases with increasing average molecular weight of the polymer. For a given stress condition and environment, there appears to be a threshold value of stress and strain for the occurrence of cracking.

VISCOSITY OF DILUTE AND MODERATELY CONCENTRATED POLYMER SOLUTIONS. S. G. Weissberg, R. Simha, and S. Rothman. J. Research National Bureau of Standards 47, 298-314 (Oct. 1951). The viscosities of solutions of three polystyrene fractions in three solvents of varying solvent power were measured at two temperatures. The relative viscosities of the systems investigated ranged from 1.03 to 43. The applicability of two empirical expressions for the concentration dependence, namely, the Martin equation and the Baker relation, is examined. In addition, the results are represented by means of polynomials of suitable degree. The numerical procedures for the evaluation of the coefficients are discussed in detail.

Testing

EVALUATION OF STRIPPABLE PROTECTIVE COATINGS FOR ACRYLIC PLASTICS. H. G. Pfleiderer and R. A. Machlowitz. ASTM Bulletin No. 178, 59-62 (Dec. 1951). Work was performed to provide a basis for a specification covering spray-applied strippable protective coatings for formed acrylic plastic parts. Tests were devised to evaluate the following properties of the protective materials: sprayability, "delivery rate" viscosity, effect on stressed plastics, usability in normal shop operations, stacking under load, adhesion, tensile strength, ultimate elongation, strippability after weathering, protection of stressed and unstressed plastic from paint materials, and storage stability. Test results on one satisfactory material are given to illustrate the test methods.



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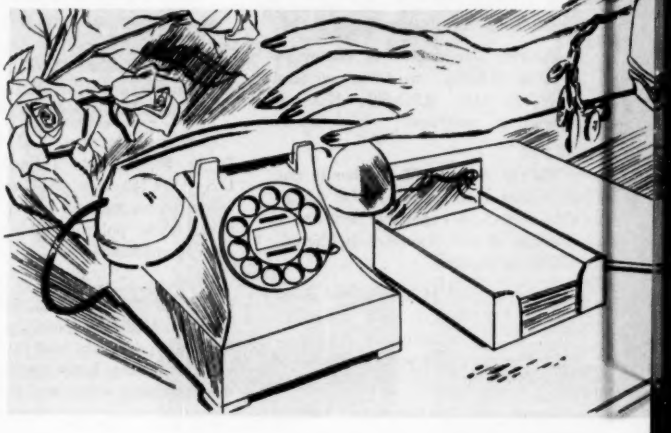

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U. S. PLASTICS PATENTS

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RESINS. H. J. West (to American Cyanamid). U.S. 2,573,525, Oct. 30. Thermosetting compositions comprising an aminoplast and a chlorotriazine.

POROUS ARTICLE. M. A. Coler (to U.S.). U.S. 2,573,639, Oct. 30. Porous article of trifluorochloroethylene polymer.

HUMIDOSTAT. W. C. Blinn and W. R. Bailey. U.S. 2,573,685, Nov. 6. Plastic hygroscopic element.

THERMOMETER. W. C. Blinn and W. R. Bailey. U.S. 2,573,686, Nov. 6. Plastic temperature indicator.

HOLLOW ARTICLES. G. W. DeBell. U.S. 2,573,693, Nov. 6. Machine for molding hollow plastic articles.

PLASTIC TREATMENT. A Banovsky and A. Kruzik (to Bata, narodni podnik). U.S. 2,573,825, Nov. 6. Kneading machinery for plastic extrusion.

POLYOL ETHERS. M. DeGroote and B. Keiser (to Petrolite). U.S. 2,573,-893, Nov. 6. A cogeneric mixture of a series of glycol ethers of phenol-aldehyde resins.

CONDENSATES. H. Jones and J. K. Aiken (to Geigy). U.S. 2,574,040, Nov. 6. Condensates of trichloroethylidenediureide with an excess of formaldehyde.

RESIN. R. L. Lehmann and J. Lintner (to Bozel-Maletra Societe Industrielle de Produits Chimiques). U.S. 2,574,114, Nov. 6. Amide-glyoxal-formaldehyde condensates for shrinkproofing textile fibers.

PACKING. E. E. Brown (to G. A. Streitz). U.S. 2,574,169, Nov. 6. Packing tool for forming and installing plastic packing material.

WIRE COATING. R. J. Anderson (to Monsanto). U.S. 2,574,313, Nov. 6. Wire coating composition containing polyvinyl formal and a drying oil-modified phenol formaldehyde resin.

POLYMER SOLUTION. A. E. Ardis (to B. F. Goodrich). U.S. 2,574,369, Nov. 6. Solution of vinylidene cyanide in tetramethyl urea.

POLYSTYRENE. R. B. Seymour (to Monsanto). U.S. 2,574,439, Nov. 6. Polystyrene plasticized with a styrene-diene interpolymer.

POLYMERIZATION. M. DeGroote (to Petrolite). U.S. 2,574,546, Nov. 13. Polymerization products of resins containing both hydroxyl and allyl radicals.

POLISHING. R. P. Piperoux, W. P. Moeller, and D. B. Hertz (to Celanese). U.S. 2,574,588, Nov. 13. Apparatus for polishing continuous thermoplastic sheet materials.

MELAMINE RESINS. R. H. Hunt, Jr. and T. P. Malinowski (to Monsanto). U.S. 2,574,741, Nov. 13. A resin made with an alkyd drying oil, melamine-formaldehyde, dicyclopentadiene.

COPOLYMERIZATION. C. J. Opp and R. E. Werner (to Interchemical). U.S. 2,574,753, Nov. 13. Copolymerization of conjugated drying oils and acids with polymerizable unsaturated compounds.

ADHESIVE. C. C. Heritage (to Weyerhaeuser Timber). U.S. 2,574,784-5, Nov. 13. Adhesive comprising a phenol-aldehyde resin and the reaction mass resulting from reacting comminuted bark water and alkali.

PLYWOOD BONDING. W. G. Van Beckum and H. L. Cook (to Weyerhaeuser Timber). U.S. 2,574,803, Nov. 13. Reaction product of comminuted bark phloem and an alkali metal compound, and adhesives therefrom.

RESINS. M. DeGroote (to Petrolite). U.S. 2,574,817, Nov. 13. Resins containing both hydroxyl and allyl radicals.

COPOLYMERS. G. L. Schartz (to Hercules). U.S. 2,574,847, Nov. 13. Copolymers of styrene and an ester of abietyl alcohol and an unsaturated carboxylic acid.

RESINS. R. J. Signer (to Visking). U.S. 2,574,893, Nov. 13. Extrudable composition of butadiene-acrylonitrile and a polyvinyl polymer prepared under pressure.

PLYWOOD TUBING. (to U.S. Plywood). U.S. 2,574,920, Nov. 13. Apparatus for forming integral molded seamless plywood tubing

POLYVINYL ESTERS. H. Rudoff (to Shawinigan). U.S. 2,574,984, Nov. 13. Reacting a polymer of a vinyl ester with an acylating agent to form a mixed ester of polyvinyl alcohol.

VINYL RESINS. T. H. Shelley (to Goodrich). U.S. 2,574,987, Nov. 13. Polymer of chloroethylene stabilized with an organic imide.

RESINOUS COMPOSITIONS. H. W. Coover, Jr. and J. B. Dickey (to Eastman Kodak). U.S. 2,575,006, Nov. 13. Resinous mixtures of polyacrylonitrile and polymeric esterlactones.

VINYL RESIN COMPOSITION. G. L. Fraser (to Monsanto). U.S. 2,575,011, Nov. 13. Composition of a vinyl chloride resin and 3 5-dimethyl delta 4:5-cyclohexene 1,2-di-2-ethylhexyl dicarboxylate.

PLASTIC FILMS. M. A. Chavannes and G. T. Traut (to Chavannes Industrial Synthetics). U.S. 2,575,046, Nov. 13. Process for producing ornamental plastic films.

COPOLYMER. M. Prober (to G.E.). U.S. 2,575,125, Nov. 13. Copolymers of butadiene and 1,1,2-trichloro-3,3,3-trifluoropropene-1.

ADHESIVE. L. F. Fiedler and P. J. Leakey (to Goodrich). U.S. 2,575,265, Nov. 13. Adhesive containing acrylonitrile-diolefin copolymer, vulcanizing agent, aluminum foil, and a phenol-aldehyde resin.

POLYMERS. T. F. Bradley (to Shell Development). U.S. 2,575,440, Nov. 20. Crotonate esters of glyceryl polyethers of dihydric phenols.

SHEET MATERIAL. R. T. K. Cornwell (to American Viscose). U.S. 2,575,443, Nov. 20. Regenerated cellulose treated with melamine-formaldehyde resin.

RESINS. D. Faulkner, H. M. Stanley, and J. J. P. Staudinger (to Distillers). U.S. 2,575,444, Nov. 20. Plasticized vinyl resins.

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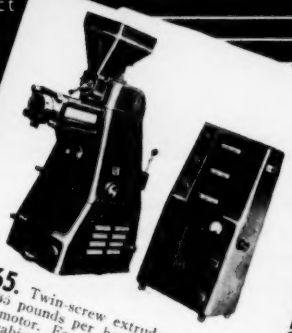

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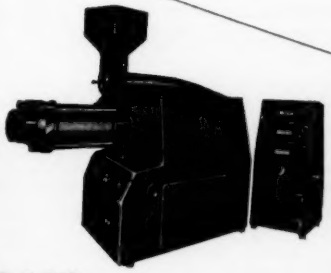

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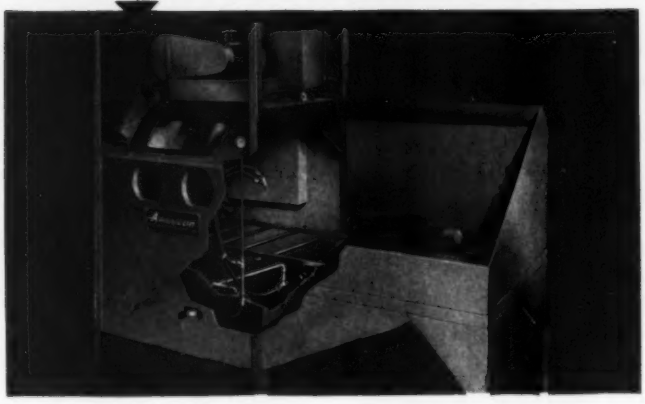

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Shell Development). U.S. 2,575,553, Nov. 20. Dispersions of plasticized polymers.

RESINS. H. A. Newey and E. C. Shokal (to Shell Development). U.S. 2,575,558, Nov. 20. Glycidyl ether compositions.

FILM. C. M. Carson (to Wingfoot). U.S. 2,575,581, Nov. 20. Rubber hydrochloride film coated with vinylidene chloride-acrylonitrile copolymer.

POLYMERS. F. W. Cox and J. M. Wallace, Jr. (to Wingfoot). U.S. 2,575,584, Nov. 20. Acrylic polymers.

FLAME RESISTANT MATERIALS. E. Simon and F. W. Thomas (to Lockheed Aircraft). U.S. 2,575,686-7, Nov. 20. Heat-resistant composition containing vinyl chloride acetate resin and a phosphate ester.

RESINS. C. D. Doyle (to G.E.). U.S. 2,575,912, Nov. 20. Gelled hydrocarbon-substituted polysiloxane resin in which the hydrocarbon groups are attached to silicon and a trialkylamine solvent.

OPTICAL ELEMENT. D. P. Cooper, Jr. (to Polaroid). U.S. 2,575,998, Nov. 20. Methyl methacrylate optical element coated with a thermosetting resin.

BUILDING STRUCTURE. E. L. Kropa, L. E. Craig, and A. S. Nyguist (to American Cyanamid). U.S. 2,576,073, Nov. 20. Structure comprising face sheets and a core of cellular resin embedded in an alkyd resin.

INTERPOLYMERS. M. Naps and F. E. Condo (to Shell Development). U.S. 2,576,075-6, Nov. 20. Interpolymers, copolymers of unsaturated nitriles.

ADHESIVE TAPE. M. L. Schechtman (to Industrial Tape). U.S. 2,576,148, Nov. 27. Adhesive tape including polyvinyl chloride-acetate, butadiene-acrylonitrile resins as adhesives.

COPOLYMERS. P. O. Tawney (to U.S. Rubber). U.S. 2,576,245, Nov. 27. Copolymerizate of a mono-2-propenyl compound, a castor oil ester, and a monoolefin.

PLASTICIZER. G. J. Shugar and W. D. Paist (to Celanese). U.S. 2,576,268, Nov. 27. Cellulose ester plasticized with a 1,4-butanediol diester.

INTERPOLYMERIZATION. P. O. Tawney (to U.S. Rubber). U.S. 2,576,370, Nov. 27. Copolymerizing a castor oil

maleate with a copolymerizable monoolefin and an aldehyde in the presence of a peroxide catalyst.

SILICONES. J. L. Speier (to Dow Corning). U.S. 2,576,486, Nov. 27. The preparation of organosilicon polyesters.

POLYMERS. P. B. Dalton (to Sun Chemical). U.S. 2,576,502, Nov. 27. Polymers of alkyl amines and methylene-bis(methacrylamide).

VINYLCYCLOHEXENE. H. L. Johnson and A. P. Stuart (to Sun Oil). U.S. 2,576,515, Nov. 27. Polymerization of vinylcyclohexene.

POLYMERIZATION. J. Boyko (to Du Pont). U.S. 2,576,712, Nov. 27. Polymerization of polyamides in elongated shapes.

POLYMERIZATION. B. M. Marks (to Du Pont). U.S. 2,576,720, Nov. 27. Granular polymerization of ethylenic compounds in the presence of a hypophosphite.

POLYMERS. E. E. Novotny and G. K. Vogelsang (to Borden). U.S. 2,576,722, Nov. 27. Preparation of chloroanacardic polymers.

RESINS. G. K. Vogelsang (to Borden). U.S. 2,576,735, Nov. 27. Nitrogenous resins from ketone-aldehyde-amine-phenol condensation.

CELLULAR BODIES. P. J. Carpentier. U.S. 2,576,749, Nov. 27. Mixing polyvinyl resin with azo-isobutyric dinitrile and phenyl mono-isocyanate to form a cellular mass.

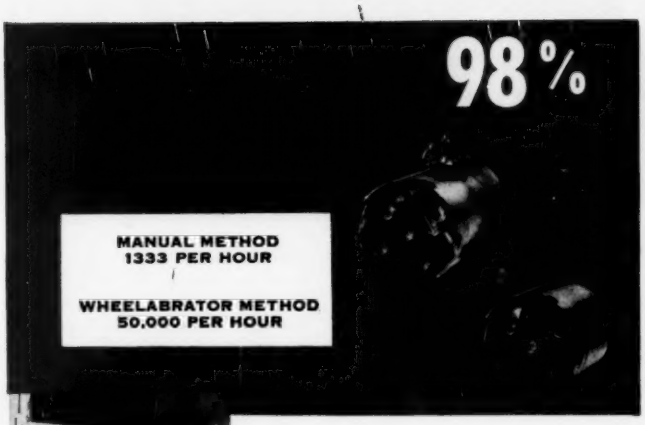
GEL COMPOSITION. C. E. Barnes and W. O. Ney, Jr. (to General Aniline). U.S. 2,576,820, Nov. 27. Thermoreversible gel of polyvinyl alcohol.

RESINS. C. E. Barnes (to General Aniline). U.S. 2,576,821, Nov. 27. Color stable resins of haloacrylic acid ester of a partial ester of a polyhydric alcohol.

POLYMERIZATION. G. D. Jones (to General Aniline). U.S. 2,576,839, Nov. 27. Polymerization of alkylolamides of acrylic acids.

GELLING POLYMERS. O. W. Murray (to Du Pont). U.S. 2,576,850, Nov. 27. Treating a vinyl alcohol polymer with an acylacetamide of an aromatic amine.

CELLULAR PLASTICS. J. L. Amos (to Dow). U.S. 2,576,911, Dec. 4. Cellular vinyl aromatic resin expanded with a monoalkyl halide.



at SMITH & STONE LTD.

Smith & Stone Ltd., Georgetown, Ontario, installed a Wheelabrator to replace conventional manual finishing methods, for deflashing compression molded plastic parts. Production on the socket shell, illustrated above, zoomed from 1333 pieces to 50,000 per hour. Similar production gains resulted in processing scores of other plastic parts.

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Uniform deflashing for better quality
Decreased use of costly broaches
Handles more than 50% of all production
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Wheelabrating—an exclusive American process—removes flash by pelting the parts with millions of small, nonabrasive particles capable of reaching into the most inaccessible places without any damage whatever to the part. More than 50 Wheelabrators are already in service in the Plastics industry.

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Bulletin No. 674 contains complete information and factual case histories on the time and cost saving performance of the Wheelabrator. *Write for your free copy.*

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NEW MACHINERY AND EQUIPMENT

SLITTER-REWINDER—Primarily to be used in large scale production slitting of plastic film, foil, and pressure sensitive tape, this new machine produced by John Dusenbery Co., Inc., 271 Grove Ave., Verona, N.J., is also suited for engineering development purposes, e.g., slitting new products and obtaining quantitative data on products in production.

Air-operated controlling devices on the payoff and rewind enable determination of optimum running conditions and future duplication of previous performances. Adjustable slip clutches which drive the main pull rolls and grooved cutting rolls may be idled or over-driven to control stretch. The machine itself is adapted to two types of cutting—1) razor blade slitting by means of a worm and worm wheel that raises and lowers the blade in and out of engagement with the slitting roll and 2) burst cut slitting using a male knife mounted on a holder that runs in a groove in the slitting roll.

Other features of the machine include independent, air-operated rewind clutches which enable presetting the tension for different materials or controlling it as the roll builds up; rewind mandrils built on the differential winding principle and held in place by air-operated mandril locks, which can be reversed to remove the mandril from the machine; and a cant roll for straightening the web as it leaves the mill roll.

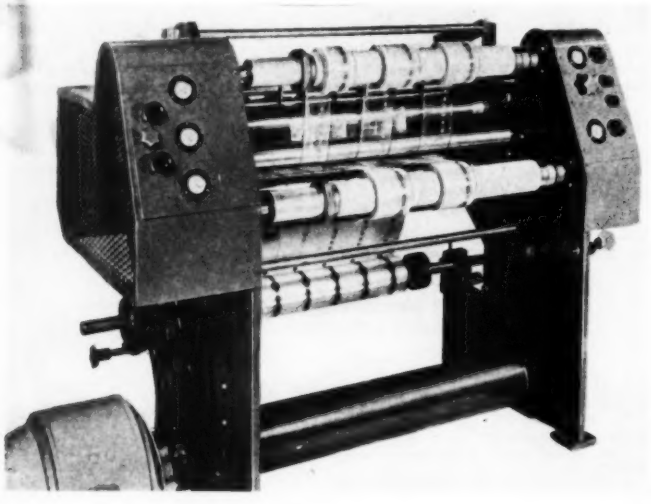
The specifications of the slitter-rewinder are: rewind diameter, 12 in.; core diameters, 1 and 3 in.; minimum slit width, 3/8 in.; maximum speed, 500 fpm; and widths of 32, 42, 52, and 62 inches.

PYR-O-VANE CONTROLLER—Incorporating a new high resistance measuring system plus a new vane type electronic control unit, a millivoltmeter pyrometer is now being produced by the Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44, Pa. The controller can be used on ovens, furnaces, or salt baths in heat-treating shops, in plastics molding plants, etc.

Both the measuring and control mechanisms are plug-in units that are easily removed or replaced.

The measuring unit consists of a galvanometer pointer assembly, which responds instantly to any change in the thermocouple emf. Snap-action of the control relay takes place instantaneously when the lightweight metal vane which is part of the assembly reaches a certain position between two oscillator coils attached to the set-point index. The unit has a calibrated accuracy to within 1% of total span.

The model is available in one, two, or three position electronic control, for operating on 115 volts, 50-60 or 25 cycles, or 230 volts, 50-60 cycles.



MIDGET CUTTER—Redesign of its midget cutter to add several heavy duty features has been announced by Ball and Jewell, Inc., 22 Franklin St., Brooklyn 22, N.Y. An outboard bearing has been added to the machine for sturdiness and the single bar cradle has been replaced with the conventional swing type which gives support to the screen all around the edge. The hopper is available with dual-purpose side chutes for feeding large area sprues flat, thus eliminating twisting of the sprues and their clogging up the hopper by untwisting.

Sectional thicknesses of from 1/4 to 1/2 in., dependent on the material, are handled at 50 to 75 lb. per hour.

TESTING MACHINE—A low-cost universal testing machine, with capacity of 120,000 lb. in tension and compression, has been announced by Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. The machine features the separation of the hydraulic loading unit from the indicating and control unit, thus preventing recoil from breaking test specimens and permitting the adjustment of maximum or lazy hands with minimum drag.

The two-column design with 15 in. clear lateral space between columns gives easy access to test specimens and simplifies observations. Load is applied upward by an integrated piston and elevating cage, consisting of the table, two uprights, and upper gripping head, all of which have a 6-in. power stroke. The lower gripping head is the upper member of a second cage, with an adjustment range of 20 in., and consisting of two long columns extending down through the table to a lower crosshead supported by a vertical screw integral with the hydraulic cylinder. Vertical distance between the grip-

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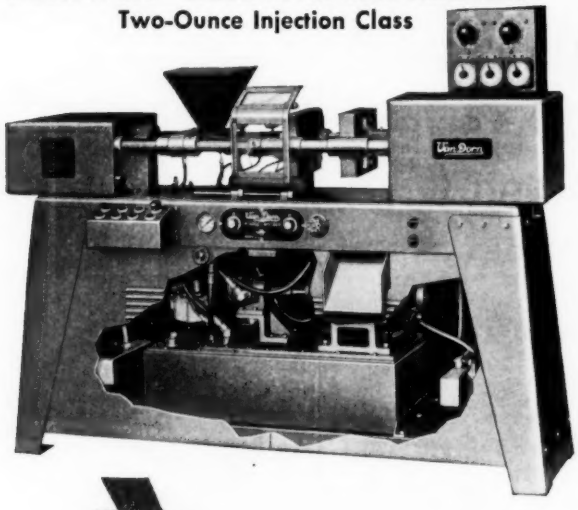
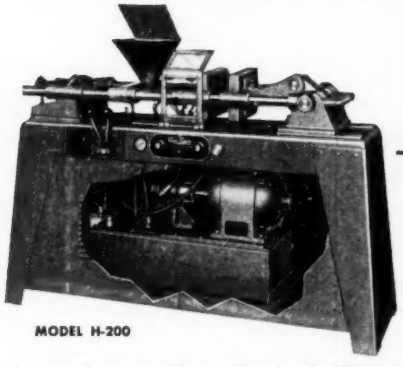
Model H-200—Leader in the Semi-Automatic Two-Ounce Injection Class



This ultra-modern press molds practically all thermoplastics including nylon. It completes up to 6 operating cycles per minute. Push button controls are safe, simple and convenient. Compact and rugged, the unit is quiet and economical in operation. Sliding gate with interlocking safety devices starts the cycle. Solenoid valves close the molds. Injection and dwell are controlled by first of three timers on the rear panel. Center timer regulates recharging of heater. The third timer controls the length of the mold close cycle; when time runs out, molds automatically open and parts are ejected. Operator opens safety gate, removes product and then closes gate to begin the next cycle . . . Variable voltage transformers in conjunction with thermostatic units control the temperatures on the two heating zones accurately.



MODEL H-200

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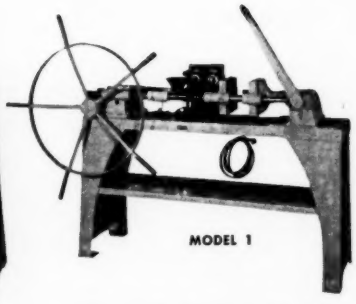
2-oz. or 1-oz. capacity. These low-cost units operate 8 hours for under a dollar and use inexpensive molds. Can easily be set up in twenty minutes by one man.



MODEL 1

Manually Operated Press

1-oz. capacity. This press is ideal for smaller jobs, experimental work and technical training.

MODEL G-100

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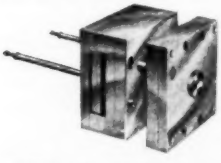

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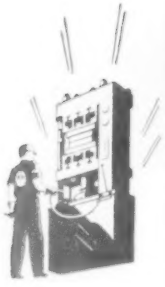

but MPM Service Goes Far Beyond Mechanical Skill

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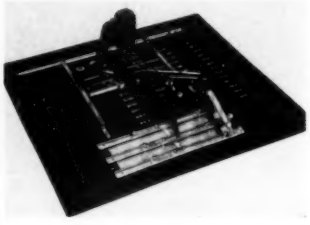
ping heads for tension tests or between platens for compression tests may be set anywhere from 1 to 24 in., the latter including the stroke.

Bourdon gages for the indicator are precision Emery type, accurate to within 1% or one dial division.

The two units in position, side by side, are 31 in. deep by 74 in. wide.

ENGRAVING MACHINE—Designed for working on panels of any dimension, an industrial engraving machine has just been announced by New Hermes, Inc., 13-19 University Place, New York 3, N.Y. Previous limitations as to engraving area and the necessity of bringing panels and other surfaces to the machine are eliminated by this model's detachable chassis which can be removed from the base and easily placed directly on the work surface for pre-



cision engraving. The machine can reproduce 15 different sizes of letters and numbers from one master alphabet and is "tracer guided" for easy operation. Special adjustable copy holding slides allow for multi-line engraving with only one set-up.

PROPORTIONING PYROMETRIC CONTROLLERS—Of special interest wherever exact temperatures must be maintained, a proportioning indicating pyrometric controller is now being manufactured by the Taco West Corp., 525 North Noble St., Chicago, Ill. Among the machines finding use for the controller are injection molding machines, where uniform control permits operating at a lower temperature setting without experiencing short shots; extruding machines, which require temperature control for producing uniform quality; and plastic packaging machines, where control assures safe closures.

The controller automatically adjusts the ratio of power "on" and "off" over a given time-cycle to maintain any desired temperature

set with the index-pointer. By thus "anticipating" temperature changes of its load, the controller eliminates the lag or thermal inertia of both the heating and the cooling cycle and makes possible a straight-line control at any precise temperature setting. It also automatically determines the percentage of time the system requires heating or during which the fuel or power input should be turned off to maintain the desired preset temperature.

A special feature of the controller is the meter pointer indicating the accurate temperature at all times, since the action takes place in the controller section of the circuit and does not affect the pointer reading. The model is available in 36 standard scale and thermocouple ranges and is powered from either 115 or 230 volts, 60 cycle lines.

DIE STEEL—From 50 to 60% as easy to hob as soft hobbing irons, yet comparing favorably with the high strength of the 5% chrome hot work die steels, a new die steel, known as Super Samson, has been developed by the Carpenter Steel Co., Reading, Pa. This combination of high

Mechanical Properties

	At room temp.	*At 800°F.*
Hardness, Brinell (as annealed)	125	———
Tensile strength, p.s.i.	187,000	183,400
Yield point, p.s.i.	150,000	146,500
Elongation in 2 in.	15.8%	19.4%
Charpy V-notch impact, ft.-lb.	32	40
Hardness, Brinell	390	———

strength and ease of hobbing makes it possible for diemakers to apply the economies of cold hobbing to more jobs. At present, the steel is being used for applications involving die casting of aluminum and zinc and in plastic mold work involving large cavities or elevated temperatures. The company claims that the steel will harden uniformly in dies with wall thicknesses up to at least 4 in. and predicts that the steel will extend the use of hobbed cavities in permitting the casting of designs that are now impractical to make in machined cavities.

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BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Manufacturing Processes (3rd Edition)," by Myron L. Begeman.

Published in 1952 by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 608 pages. Price $6.00

The third edition of this classification and description of all fundamental machines and processes—where they can best be applied, their advantages and disadvantages, the tools required for each machine, etc.—has been revised to include the most recent developments in the field. New sections on the continuous casting of metal, Marforming, hydrodynamic forming, cold and stud welding, tracer-controlled machines, and jigs and fixtures have been added. Written primarily for students and professionals engaged in production, industrial, or tool engineering work, each of the chapters is followed by a list of review questions and references. The first half of the book is devoted to foundry practice, pattern work, plastic molding, powder metallurgy, hot and cold working of metals, heat treatment, and welding. The second half covers measuring instruments, cutting tools, machines, and their accessories.

"Plastics Molding," by John Delmonte.

Published in 1952 by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 493 pages. Price $9.00

Written as a practical handbook for the plastics user, this book approaches its analysis of the plastics molding industry and its equipment from the engineer's viewpoint, considering first the ordinary flow of materials, and secondly, the techniques for handling the materials once the flow principles have been properly established. The book covers molding equipment and operations primarily, including such topics as machine requirements of the molding plant; selection and adaptation of various presses to different jobs; engineering calculations in estimating heat and pressure requirements; cost estimating procedures; preparation and handling of materials throughout the molding plant; and inspection and testing procedures for product control plant layout. A great deal of up-to-date information on the performance of materials and machines is also given.

"Engineers Illustrated Thesaurus," by Herbert Herkimer.

Published in 1952 by Chemical Publ. Co., 212 Fifth Ave., New York 10, N. Y. 572 pages. Price $6.00

Over 8000 illustrations of machine elements and assembled machinery enabling the engineer, designer, draftsman, and manufacturer to select the machine part or equipment most suitable for his special purpose are included in this efficient guide book to every type of machine element. Each of the types is reproduced and identified, and, where necessary, an explanation of the method by which it accomplishes its particular function is given. The main classes which are treated in the book include fasteners; adjusting devices; supports and structures; basic mechanical movements; elevators, cranes, derricks, conveyors; transmission of liquids and gases; combustion; prime movers; transportation; industrial processes; electrical appliances; and comfort heating, cooling, and air-conditioning. For additional convenience, a comprehensive index is offered.

"Proceedings of the 15th Annual Time and Motion Study and Management Clinic."

Published in 1951 by Industrial Management Society, 35 East Wacker Drive, Chicago 1, Ill. 128 pages. Price $4.00

Illustrated with charts and forms, the proceedings of the 15th Annual Time and Motion Study and Management Clinic, sponsored by the Industrial Management Society, are now available in book form. The text is made up of complete transcripts of talks by top leaders of labor, management, and government on various topics, including time study, motion economy, methods, plant layout, materials handling, wage incentives, maintenance, and human relations.

"Fluorine and Its Compounds," by R. N. Haszeldine and A. G. Sharpe.

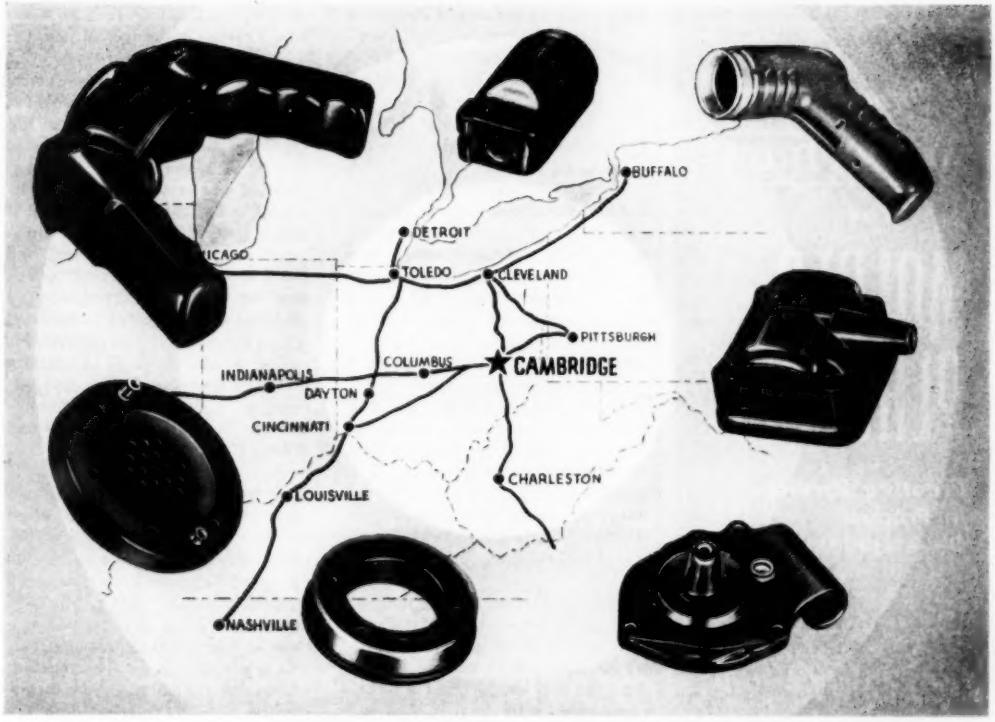
Published in 1951 by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 152 pages. Price $1.75

The first in a series to be known as Methuen's Monographs on Chemical Subjects, this book serves as a review of the modern inorganic and organic chemistry of fluorine. Special emphasis is placed on the relation between structure and properties of inorganic fluorides and on the influence of fluorine on the properties and reactivity of organic compounds.

Plasticizers—Listing the company's major plasticizers, this illustrated catalog offers information on the physical properties and qualities of each. The descriptions are accompanied by a short report on the advantages available and the various uses to which the products may be put. A handy reference table compares the physical properties of the more important plasticizers. *Hardesty Chemical Co., Inc., 41 East 42 St., New York 17, N.Y.*

Progress in scientific management—Each of the publications in a series on scientific management presented over the years by the American Management Assoc. is catalogued in this pamphlet. The series itself is broken down into eight divisions, covering the following fields of management: personnel; producton; office management; financial management; marketing; insurance; general management; and packaging. Publications are listed under each category by series number and title, together with the price and a short description of the contents. *American Management Assoc., 330 West 42 St., New York 18, N.Y.*

National Science Foundation—The first annual report of the National Science Foundation is contained in this 31-page pamphlet. The body, formed by Act of Congress in 1950 to promote scientific research and development in the interests of national welfare and defense, is described as to organization and func-



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tions. World events leading up to the group's formation and its current plans for developing a national science policy are outlined. Included also are estimates of the research and development expenditures and their allocation. *National Science Foundation, Office of the Director, Washington 25, D.C.*

Rubber substitutes—Advantages and properties of rubber substitutes (vulcanized vegetable oils), used in molded products, proofed goods, and all types of extruded goods, are discussed in this technical bulletin. The substitutes are employed with natural and synthetic rubber to impart some specific property to the finished product, to aid in the processing of the compound, and to act as an extender. By replacing rubber hydrocarbon in a compound, it is claimed that the material will reduce cost under normal conditions. *Harwick Standard Chemical Co., 901 Broad St. Bank Bldg., Trenton 8, N.J.*

Plastic awnings — Durably made of translucent, shatter-proof plastic, this innovation in awnings is described in a 4-page brochure. Advantages of the awning in both consumer and commercial applications are explained. Included are samples of the material in several of the various pastel shades available. *Atlanta Ventilated Awning Co., 696 Greenwood Ave., N.E., Atlanta, Ga.*

Laboratory research—Research facilities of a major chemical company are described and illustrated in this 16-page booklet, No. 2 in a series issued by the house organ, "Kellogram." As an example of the work done in the laboratories, the booklet follows the research and development that went into bringing fluid hydroforming and the special fluorocarbon, Kel-F, onto the commercial scene. Photographs portray the part played by each of the laboratory's divisions—from the original exploration and study to the construction of a pilot plant. *M. W. Kellogg Co., 225 Broadway, New York 7, N.Y.*

Calendar—This 10 by 16-in. wall calendar is illustrated with a Boiling Points of Gases Conversion Chart, listing gases from carbon tetrachloride to helium in Centigrade, Farenheit, and absolute scales, and a 4-color photograph of the transfer of liquid helium from a Collins Cryostat. *Arthur D. Little, Inc., 30 Memorial Drive, Cambridge, 42, Mass.*

High - temperature tubing—Factors affecting tube life in high-pressure, high-temperature applications are presented in a 40-page illustrated booklet. The information offered was obtained as a result of a great number of investigations of failures of carbon steel, intermediate chromium-molybdenum alloy steel, and stainless steel tubing in boilers, cracking stills, heaters, and heat exchangers during service at elevated temperatures and pressures. Also included is an outline of the history and experience behind the development of high-temperature tubing. *Tubular Products Div., Babcock and Wilcox Co., Beaver Falls, Pa.*

Skin protection—Available for use by medical directors, safety engineers, or plant executives, this technical bulletin offers information on an antiseptic, anti-histaminic hand lotion for use in industry. Chemical ingredients of the lotion, which, it is claimed, will guard against infections and skin rashes, are listed, together with a description of its use in improving work efficiency. *Vanfaire Products, 3757 Wilshire Blvd., Los Angeles 5, Calif.*

Dust and fume control—Descriptions of the various sizes and models of cloth-type dust collectors and the advantages to be gained from cloth filtration are offered in this 36-page catalog (No. 72-B). Depending on the application, various types of cloth may be used as filters and, where requirements prevent any interruptions for shaking out, automatic collectors are provided. The booklet presents each type of collector with complete specifications, construction drawings, cut-away views, and illustrations of installations. *American Wheelabrator and Equipment Corp., Mishawaka, Ind.*

Molding styrene plastic — Designed for use by those interested in a comprehensive review of fundamental thermoplastic molding procedures, this 16-page booklet "Operating Suggestions for Molding Lustrex Styrene Plastic," serves as a handy reference guide from mold product and design to scrap segregation and recovery. Included are suggestions for the im-

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Naugatuck Chemical Division of **UNITED STATES RUBBER COMPANY**

203 ELM ST., NAUGATUCK, CONNECTICUT

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario

MARVINOL® vinyl resins • KRALASTIC® styrene copolymers • VIBRIN® polyester resins

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JODA
PLASTIC
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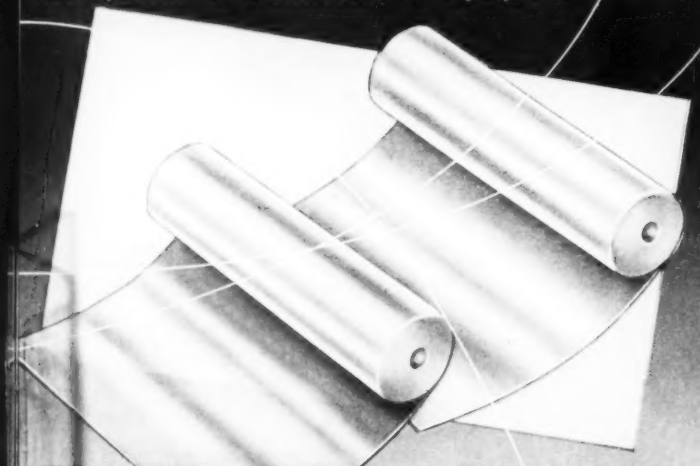
LIGHT-TO-HEAVY GAUGES
Transparent • Translucent • Opaque • Colors



CELLULOSE ACETATE
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LOW COST
EXTRUDED SHEETS
CONTINUOUS ROLLS
or Cut to Size

Rods & Tubes

specializing in
THIN GAUGE
ACRYLIC SHEETS

JODA PLASTIC SHEETS ARE ADAPTABLE FOR DEEP DRAWING and all other types of forming, printing, and silk screening.

JOSEPH DAVIS PLASTICS CO.
ARLINGTON
NEW JERSEY

proving of operating efficiency and the handling of such problems as storage, scheduling, molding techniques, and post-molding methods. A feature of the booklet is a 3-page efficiency check list based on the topics reviewed in the text. *Monsanto Chemical Co., Plastics Div., Springfield 2, Mass.*

Textolite industrial laminates — All the information necessary to permit engineers to select grades most applicable to their particular design problems is contained in this 8-page catalog of Textolite industrial laminates. Each of the numerous grades is described by applications and characteristics, including mechanical, chemical, physical, thermal, and electrical properties. Sheet sizes and thicknesses and tolerances are also given. *General Electrical Co., Chemical Div., Pittsfield, Mass.*

Composite catalog—Principal instruments, control devices, and the related components manufactured by the company are described in this 28-page catalog (No.5000). Approximately 100 measuring and control instruments, and valves are listed; including pyrometers; potentiometers; flow and liquid level meters; thermometers; thermocouples; pressure gages; motorized valve assemblies; control valves; relays; and such new designs as the differential controller and the Tel-O-Set controller family. Each item is accompanied by specifications, photographs, and a short description. *Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Station 40, Wayne and Windrim Aves., Philadelphia 40, Pa.*

Pocket book on fabricating plastics —With special emphasis on the reduction of costs, the conservation of plastics, and the speeding of fabrication, this new handbook offers suggestions as to general rules to follow, tooling recommendations, and feeds and speeds which help in the most efficient fabrication of plastic. Topics covered include economics in ordering; general machining tips; turning; drilling; tapping and threading; punching; shearing; sawing and cut-off; milling and planing; forming and drawing; screw machine operation; and finishing and marking. Tables and measurements accompany the text. *Continental-Diamond Fibre Co., Newark 46, Del.*

SINGER* 248-2
ELECTRONIC SEAMER

FOR BOND-SEAMING THERMOPLASTICS

Makes Seams

- Watertight
- Airtight
- Nearly Invisible
- Stronger Than Material

Ask About SPECIAL ATTACHMENTS

for making edge folds, tie strings, belting, binding, hemming and numerous other operations.

THE SINGER 248-2 is *completely* portable—a compact unit with low power consumption that can be moved where you need it when you need it. Turns out perfectly bonded seams in almost any thermoplastic material, calendered or cast. Tacks and spot seals, too. And you can change attachments in a matter of seconds. No bother about precise adjustments for paralleling or masking electrodes and flashover connot damage the specially designed and plated electrodes. Ask for descriptive leaflet about the 248-2 Electronic Seamer at your nearest SINGER Shop for the Manufacturing Trade.

VISIT
Our Booth at the 5th National Plastics Exposition Convention Hall, Phila. March 11 through 14

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LAMINATED PLASTIC BAKELITE

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FACE AND BACK FARLITE VENEERED

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OTHER USES FOR FARLITE

- DINETTE TOPS
- COUNTER TOPS
- DRESSER TOPS
- PARTITIONS
- WAINSCOT, BARS
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- PERMANENTLY BRIGHT COLORS THAT WOMEN LOVE-MANY PATTERNS AND COLORS TO CHOOSE FROM
- SANITARY . . . . NO CRACKS OR PORES IN WHICH FOOD PARTICLES CAN LODGE

Use FARLITE where the going is rough . . . It resists scuffing, abrasion, chipping, denting and staining. The easy-to-clean surface is not affected by hot or cold liquid, alcohol, fruit juices, grease or mild cleaning solutions. Never needs refinishing. FARLITE is a high pressure laminate of the finest quality. It greatly improves the value and appearance of any surface where beauty of color and utmost durability are demanded.

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PLASTICS DIVISION

FARLEY & LOETSCHER MFG. CO.

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leading molders say the answer is—

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...FOR COMPRESSION, TRANSFER AND AUTOMATIC MOLDING

...FOR EXTRUSION AND DRYING PROCESSES

Before you buy any size of preheater, look first to **W. T. LA ROSE & ASSOCIATES, Inc.**

TROY, N. Y.

MOSLO

Minijectors

High Speed PRODUCTION
Low Cost OPERATION

Want volume injection molding with low die expense? Then investigate these small high-speed Moslo Minijectors—which in hundreds of cases are out-performing larger machines in turning out small molded pieces or parts. Every Minijector is built for lasting service and will provide economical, efficient, automatic operation.

MOSLO DUPLIMATIC MINIJECTOR—especially for insert molding of cord-plugs, switch parts, etc. A two-sided self-positioning lower mold section allows operator to remove finished molded part from the mold section and refill with new inserts while the other mold section is in cycle. Automatic hydraulic operation provides for complete operator safety. Mold casting area 40 square inches. Injection pressure 20,000 p.s.i. Injection capacity to 4 oz.

We invite you to see

our units in Operation Exhibited at Booths 504-506 5th National Plastic Exposition March 11-14, 1952 Philadelphia Convention Hall. Territories open for distributors, excepting New York and New England territory.

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accepted names
in the dry coloring field

Mid-America Plastics, Inc., in full production capacity, is supplying the industry with dry colorants. Our completely equipped laboratory and modern manufacturing facilities is formulating and compounding "Colorblende" the dry colorant, and "Dispersa" the wetting agent. You can get immediate delivery of "Colorblende" in 17 Bureau of Standards colors or specify any special colors.

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Quick—Easy—Dust Free—Economical

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MID-AMERICA PLASTICS, INC.
COLOR DIVISION
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DENFLEX
PLASTISOLS
for
MOLDING
DIPPING
COATING
Immediately Available From
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CHEMICAL COMPANY
2701 Papin St. St. Louis 3, Mo.
Benefit from our many years of experience in this specialized field
ORGANOSOLS PLASTIGELS

M&M plastic granulator

In today's market the use of every available piece of scrap has become increasingly important. The M & M Plastic Granulator designed for "on the job grinding" can turn the material from your scrap barrel into usable granules and extra profit. Investigate today!

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66

Production of

FOR the purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant for transfer to other plants

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled

Materials	*Total p'd'n. first 10 mos. 1951*	*Total sales first 10 mos. 1951*
CELLULOSE PLASTICS:[a]		
Cellulose acetate and mixed ester plastics:		
Sheets, under 0.003 gage	13,941,545	13,589,777
0.003 gage and over	9,625,590	9,448,832
All other sheets, rods and tubes	5,110,451	4,751,935
Molding, extrusion materials	58,157,436	55,950,461
Nitrocellulose:		
Sheets	5,666,518	4,821,151
Rods and tubes	888,608	1,016,750
Other cellulose plastics[b]	10,633,451	9,798,201
PHENOLIC AND OTHER TAR ACID RESINS:		
Laminating	65,016,022	44,595,166
Adhesive	57,305,696	33,577,644
Molding and casting materials[a]	200,086,986	177,038,782
Protective coatings (unmodified and modified except by rosin)	25,020,022	19,217,037
Miscellaneous uses	64,809,613	61,581,577
UREA AND MELAMINE RESINS:		
Adhesives	69,285,443	65,346,003
Textile-treating resins	57,519,270	53,361,334
Paper-treating resins	14,271,361	13,290,121
Protective coatings, modified and unmodified	22,051,626	15,735,892
Miscellaneous uses, including laminating and molding[a]	71,833,880	63,381,566
STYRENE RESINS:		
Molding materials[a]	224,905,566	212,648,341
Protective coatings, modified and unmodified	37,325,147	35,718,586
Miscellaneous uses	49,093,251	42,033,399
VINYL RESINS: [d] Total	381,886,912	343,430,520
Sheeting and film (resin content)[e]		137,890,771
Adhesives (resin content)		11,608,109
Textile and paper-treating resins (resin content)[f]		37,888,376
Molding and extrusion materials (resin content)		115,035,052
Protective coatings (resin content)		21,116,773
Miscellaneous uses (resin content)		19,856,439
COUMARONE-INDENE AND PETROLEUM POLYMER RESINS:	142,314,522	141,109,719
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:		
Molding materials[a, g]	67,520,475	58,698,761
Protective coatings[h]	15,136,896	17,426,196
All other uses[i]	84,507,121	80,267,656

* Dry basis unless otherwise specified. † Revised. [a] Includes fillers, plasticizers, and extenders. [b] Includes sheets, rods, and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Production statistics by uses are not representative, as end-use may not be known at the time of manufacture. Therefore, only statistics on total produc-

Plastics Materials

of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

IN POUNDS* FOR SEPT. AND OCTOBER, 1951 by U. S. Tariff Commission

September 1951		*October 1951*	
Production	*Sales*	*Production*	*Sales*
1,408,386	1,295,681	1,354,816	1,157,530
754,529	711,694	684,200	683,648
504,656	356,150	392,318	365,243
4,439,759	4,519,349	4,564,365	4,508,665
345,385	360,930	551,130	448,228
52,785	85,768	63,803	91,898
1,049,803	835,277	918,718	561,980
5,272,586	3,656,372	6,058,563	4,020,643
3,372,177	3,204,369	3,906,828	3,827,838
18,307,775	16,415,562	23,517,934	20,101,650
2,461,600	2,102,688	2,999,497	2,442,243
6,101,803	5,840,355	7,639,867	6,741,640
5,333,863	5,300,627	6,031,474	5,539,909
1,834,287	1,721,803	1,934,082	1,397,567
1,448,348	1,506,131	2,138,874	1,645,614
1,327,580	1,058,582	1,715,508	1,357,883
5,944,889	5,260,196	5,817,331	5,462,542
25,776,041	22,952,214	24,392,654	23,315,545
3,521,899	3,320,673	4,362,996	4,352,517
4,596,325	3,683,787	5,140,897	4,465,576
39,153,821	30,328,828	41,898,440	33,392,299
	11,509,648		13,943,236
	1,082,729		925,191
	3,583,926		3,907,384
	10,589,495		10,279,485
	1,598,724		2,181,463
	1,964,306		2,155,540
15,115,607	14,781,787	15,075,206	15,201,427
7,810,343	5,648,037	8,072,666	6,711,259
1,464,751	1,905,520	1,622,921	1,920,256
7,637,116	7,253,213	8,073,616	8,075,455

tion are given. * Prior to January 1951, statistics were given on the basis of total weight. [f] Includes data for spreader and calendering-type resins. [g] Includes data for acrylic, polyethylene, nylon, and others. [h] Includes data for epichlorohydrin, acrylic, polyester, silicone, and other protective coating resins. [i] Includes data for acrylic, rosin modifications, nylon, silicone, and other plastics and resins for miscellaneous uses.

COTTON FABRICS

FOR COATING AND LAMINATING

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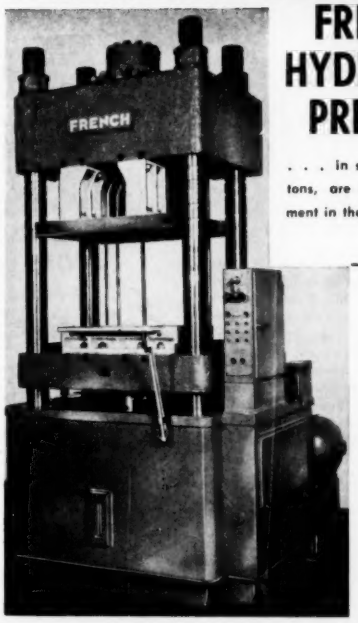
J.H. LANE & CO., Inc.

250 W. 57th St. · New York, N. Y.



FRENCH HYDRAULIC PRESSES

. . . in sizes up to 1,500 tons, are standard equipment in the plastic industry.

Write for our catalog

THE FRENCH OIL MILL MACHINERY CO.
(HYDRAULIC PRESS DIVISION)
PIQUA, OHIO U.S.A.

Sterlco

MODEL 6002
MOLD TEMPERATURE
Control Unit

APPROVED
BY LEADING PLASTIC MANUFACTURERS

The most difficult temperature control problem can be quickly solved with a dependable Sterlco Model 6002. This new self-contained dual unit consists of two independent heating, cooling and circulating systems housed in a single portable unit. Efficiently adapted to large or small molds . . . ready to operate. Leading manufacturers are finding the solution to their toughest temperature control problems with Sterlco Model 6002.

Send for Bulletin No. 551.

5th NATIONAL PLASTICS EXPOSITION
PHILADELPHIA
MARCH 11-14
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See our DISPLAY
BOOTH 116

Exclusive Features

- Modulating temperature control — not "on and off."
- Small total water capacity — quick heating and cooling.
- High-head, high-capacity pumps — fast response to controls, fast response to temperature adjustments.
- High, easily accessible hose connections on back — shorter hoses without floor drag.
- Compact size — minimum space requirement.

MANUFACTURERS OF TEMPERATURE CONTROL EQUIPMENT SINCE 1916

Sterlco Model 6002
MOLD TEMPERATURE CONTROL UNIT
INDUSTRIAL CONTROL DIVISION
STERLING, INC.
3736 N. Holton Street • Milwaukee 12, Wis.

Multiple Uses

(*Continued from pp. 96-7*)

Kraft paper bags a customer gets "for free" from grocery stores. No refills necessary. F) Styling: Colorful container and lid. All corners are of generous radii; there are no sharp corners or protruding members.

Multiple uses and sales opportunities: A) Hamper for lingerie, socks, stockings, etc., in the bathroom. B) Hamper for soiled clothes in nursery. C) Sanitary waste receptacle for hospital rooms. D) "Pin-up" waste basket with or without lid and chute. Can be placed on wall, in knee-hole space under desk, or on side of desk.

Where do we go from here? We must:

A) Stop! being a prisoner of past traditions. Stop! copying competitors' products.

B) Broaden and intensify our research on the techniques of finding out "what to make."

C) Do a better job of filling unknown but desirable customer needs.

D) Translate customer desires and needs into practical designs and products.

E) Take more of the gamble out of the cost of tools, inventory, sales, advertising, and distribution expense by pre-testing and selling new ideas before manufacture.

F) Explore and develop new products and lower cost fields of distribution where the price angle is not a paramount factor.

G) Make up our minds that nothing is expensive or too high priced if it can be merchandized.

H) Not only keep up with the other fellow—we've got to shoot under par to keep ahead of him.

I) Set up a budget and allocate some real money for a research and development program and tie it in with sales promotion activities. If these designs are well engineered, meet people's desires, and fill their needs, they will cost less, work better, and sell better in sufficient quantities to justify their cost.

Designing plastics products for tomorrow's customers is no job for amateurs. It's a professional job, calling for innate good taste, knowledge of people, materials, tools, and merchandising, and mature business judgment.—END

Plastic SCRAP

WE BUY

POLYSTYRENE, CELLULOSE ACETATE, ETHYL CELLULOSE, POLYETHYLENE, BUTYRATE, VINYL, ACRYLIC.

Dept. MP

GERING Products Inc.

WRITE • WIRE • PHONE • CABLE

KENILWORTH, N. J.

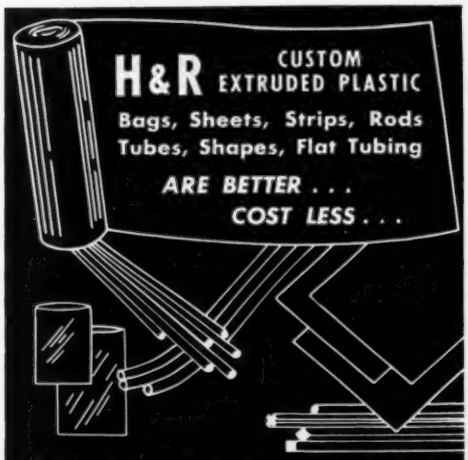
Booth 436 at the Plastics Show

30 years' expert know-how and l

H&R CUSTOM EXTRUDED PLASTIC

Bags, Sheets, Strips, Rods
Tubes, Shapes, Flat Tubing

ARE BETTER . . .
COST LESS . . .



H & R offers a complete custom extrusion service capable of turning out the right plastic material in the exact form you need, at a price you'll appreciate. We are fully equipped to make all necessary dies and to fabricate heavy polyethylene with hot gas welding.

Send us your problem—we'll be glad to send samples, recommendations and quote prices. Absolutely no obligation on your part.

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Beryllium copper at its best

is TRU-CAST by MANCO

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VISIT BOOTH #135 AT THE

NATIONAL PLASTIC EXHIBITION

AND TALK WITH OUR ENGINEERS

MANCO PRODUCTS INC.

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Melvindale, Michigan

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COMPRESSION
INJECTION
EXTRUSION
FABRICATION

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Plant and General Offices: DEXTER, MICHIGAN

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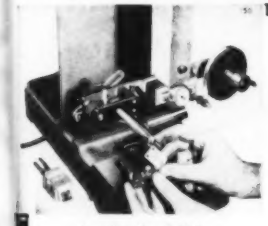
CHICAGO
MOLINE, ILL.
SOUTH BEND
LANSING



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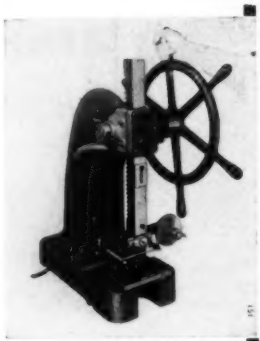
HOT STAMPING MACHINE

Hercules No. 3 Unit

BUY THE ABOVE UNIT
PUT IT IN THE RAM OF
YOUR–

ARBOR
FOOT or
PUNCH PRESS

for GOLD, SILVER or COLOR,
STAMPING OF PLASTICS AND
PAINTED METALS, WOOD FIBRE, ETC.



Hercules No. 3
UNIT ASSEMBLED
IN HERCULES
ARBOR PRESS
for Hot Stamping
Crystal Holders

ACROMARK

THE ACROMARK COMPANY
5-15 MORRELL ST., ELIZABETH, NEW JERSEY

Schoolroom

(*Continued from pp.* 98-9)

vide daily flexibility of desk location. The desk is equipped with an instrument panel for controlling lights, television panel, and motion picture panel. The top of the desk is finished in mar-proof laminate for ease of maintenance and cleaning.

Plastics in the Furniture

The teacher's chair has seat and back pans of molded plastic and is upholstered in plastic sheet over foam cushion. Both desk and chair are mounted on tubular legs coated with plastic.

Above the teacher's desk there is a plastic model of the solar system which combines instructional value and decorative interest.

The students' desk and chair units are designed to be easily movable to positions marked by the grid lines and circles on the plastic tile floor. The desks are of molded plastic with tubular frames and laminated plastic tops which are hinged so that, as shown in the drawing, they can be raised to easel position. The seat and back of the chair are integrally molded of glass reinforced plastic to fit body contours. Full advantage has been taken of plastic materials and processes to round corners and eliminate sharp projections on all equipment. A major advantage of plastic for the schoolroom is that it can be designed for safety.

The desk and chair assembly is equipped with two plastic wheels in front. Simply by lifting the rear of the assembly, the complete unit can be moved like a wheelbarrow.

As we approach the recreation area, there is a movable plastic panel which partly closes off the recreational area from the classwork area. Next to it is a perforated plastic display panel mounted on a floor-to-ceiling tube which pivots in any direction.

Mounted on wall panels are more maps and other visual material such as photo murals and paintings. Below the panels are wall-mounted folding couches upholstered in washable plastic material. Here, tired youngsters can take naps between classes or games.

To the right, and running directly into a separate storage room, is another plastic panel which, as it is in

A New Adamson United Horizontal Calender Designed especially for *FLOOR TILE*

This completely redesigned 30" x 54" two-roll, horizontal, floor tile calender, built for a leading manufacturer of flooring material, embodies the following features:

Rolls—chilled cast iron, drilled type, supported in anti-friction, self-aligning roller bearings, flood lubricated.

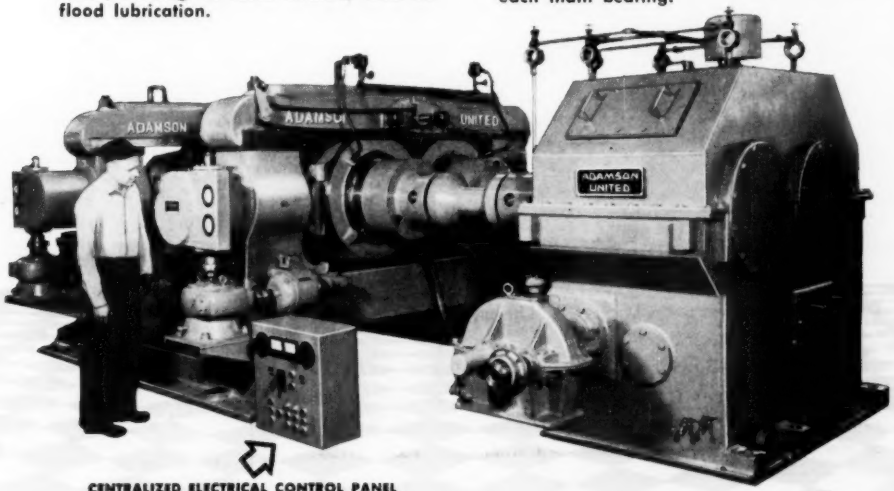
Connecting gears housed in separate pinion stand, running on fixed centers, with oil flood lubrication.

Front roll driven by means of Mill-Type, Universal Coupling.

Roll Adjustments—automatic type, driven by electric motors. Selsyns and counters continuously indicate exact position of front roll.

Calender speed controllable over a wide range.

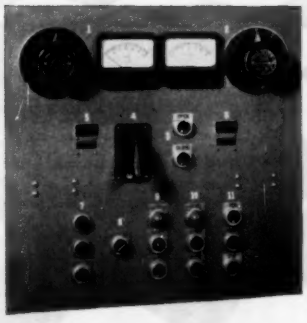
Sight gages, valves and temperature indicators provided for controlling oil flow to each main bearing.



CENTRALIZED ELECTRICAL CONTROL PANEL FOR TANDEM ARRANGEMENT OF TWO CALENDERS

1. Speed Control and Indicator for Calender No. 1.
2. Speed Control and Indicator for Calender No. 2.
3. Push Button Control for Both Roll Adjustment Motors.
4. Selector for Roll Adjustment Motors.
5. Roll Gap Indicator—Left Adjusting Screw.
6. Roll Gap Indicator—Right Adjusting Screw.
7. Variable Speed Clutch and Emergency Brake Control.
8. Selector Switch for Either Tandem or Individual Operation.
9. Pinion Stand Lubrication Pump Controls.
10. Main Roll Bearing Lubrication Pump Controls.
11. Main Drive Motor Control.

Write for our new calender catalog.



Enlarged view of electrical control panel

We can furnish field service on honing refiner and calender rolls in place. Write for details.

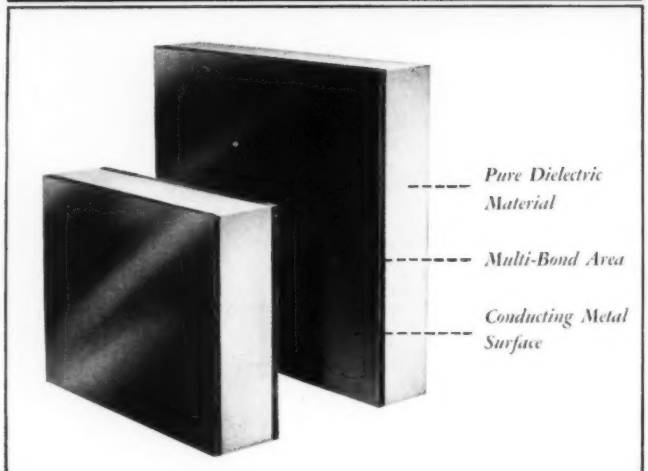
ADAMSON UNITED COMPANY

AKRON 4, OHIO

SUBSIDIARY OF UNITED ENGINEERING & FOUNDRY COMPANY

Branch Offices in Principal Cities

CHEMELEC MULTI-BOND



Metal Faced TEFLON*

● Here is the answer to the bonding and hermetic sealing of dielectric materials to metal components.

Chemelec Multi-Bond is metal faced pure or filled TEFLON, produced by an exclusive (patents pending) method of uniting fluorocarbon resins and metals with an interlocking bond unaffected by severe mechanical shock, vibration and unequal rates of thermal expansion.

The bond is micro-crystalline in structure and gradually changes from dielectric to metal, the conducting metal surface being applied by electro-deposition or other conventional means.

Facing metals include practically all the ferrous and non-ferrous metals, the ferro magnetic group and the precious metals.

Sheets are available, metal faced on one or both sides, in thick ness from .034 to 1.75 in. and in sizes up to 36 in. square.

Write for Bulletin MI-424.

*du Pont's trademark for its tetrafluoroethylene resin.

UNITED STATES GASKET COMPANY

FLUOROCARBON PRODUCTS DIVISION

650 N. 10TH STREET, CAMDEN, N.J.

FOREMOST FABRICATORS OF "TEFLON" AND OTHER FLUOROCARBON PLASTICS

the traffic line to the children's lockers, would be used as a bulletin board. This area, which is only partly visible in the drawing, would also provide general storage.

Mounted on one back wall are laminated splash-proof panels to which is fastened a dual-level plastic drinking fountain operated by control pedals flush-mounted in the floor as a sanitary measure.

To the right of the drinking fountain, there is a multi-unit lavatory with faucets controlled by floor pedals. The spigots are concealed under a plastic hood and soap tray.

The floor of the drinking fountain and lavatory area is an inlaid panel of plastic tile equipped, at joint with the general floor, with a continuous shallow trough for draining. The floor in the recreation area is inlaid with game layouts.

At the extreme right of the perspective drawing, there is shown part of a sand box or planting box of reinforced plastic upholstered to form a seat. In the left foreground are nesting play tables covered with laminated plastic and mounted on plastic casters. To the right is a toy cart of molded plastic with two plastic wheels which, like the students' desk assemblies, can be moved like a wheelbarrow.

Directly above the sand box is a world globe of translucent plastic. This is counterbalanced so that it can be lowered for study or raised out of the way.

Conclusion

The above suggestions for using plastic materials to design an efficient schoolroom are only a few of the possibilities that were conceived and considered during the preparation of this article. The various problems of schoolroom design invite the use of plastics because the characteristics of these materials—control of contours, ease of cleaning and maintenance, and simplification and standardization of units—are ideally adapted to school needs. If, as authorities assure us, America needs 600,000 new schoolrooms during the next ten years, it would pay school authorities and manufacturers of school equipment to explore the immediate possibilities of plastics structures and equipment. If such a study is made, we may expect to see the "schoolroom of the future" in American schools within the next decade.—END

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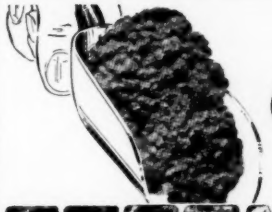

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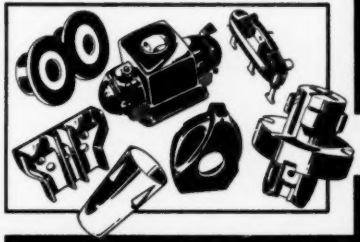

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Bathrooms

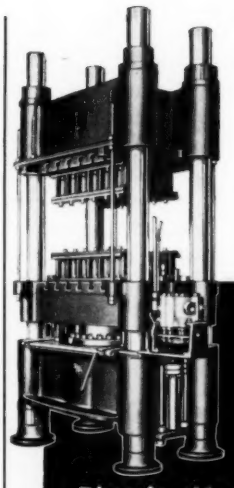
(*Continued from pp.* 100-1)

table counter is a continuation of the basin top. The table contains a tissue dispenser drawer and two small utility drawers. Next to these two drawers is a pedestal containing two more drawers with a large section beneath, faced like a drawer front, holding a fold-away scale. Above the table, the wall, mirrored as in Unit 1, contains a continuation of the medicine cabinet. The overall lighting will come from illuminated plastic panels in the ceiling and from a cove beneath the medicine cabinet.

The floor sections of each unit and the related utilities are designed to be production fabricated at the factory for distribution to selling outlets and final delivery to the site. The wall modules, 32 in. wide by room height, are divided into 16-in. squares and delivered from the distribution center according to job specifications. These specifications will vary only when a window is to replace one or more of the 16-in. squares over the bathtub or over the toilet.

Each unit desired, together with its ceiling and its containing walls, would be delivered to the job site with the required piping for water and drain lines in place and ready to hook up. The units, in whatever combinations ordered, would be dropped into place on the studs. They would be secured to each other, encased in their walls and topped by each section's ceiling.

The walls and flooring will be of sandwich type construction with the "meat" to be a resin-impregnated paper in honeycomb form. To this would be bonded laminated sheets for the wall sections and vinyl sheets for the floor sections. The shower stall floor is planned in polyester-fibrous glass mat. The wash basin, dressing table top, toilet section, and tub will be molded, possibly from acrylic, reinforced material, or one of the new copolymers. The mirror section will be of clear acrylic. The drawers in both basin and dressing table will be molded phenolic, while the doors to the storage cabinet will repeat, in lighter form, the sandwich construction of the walls, again faced with laminated sheets. Piping throughout will be plastic tubing, probably a hard vinyl.—END



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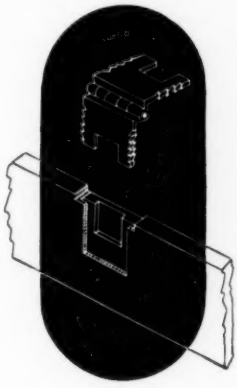

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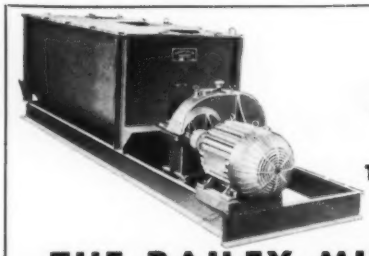

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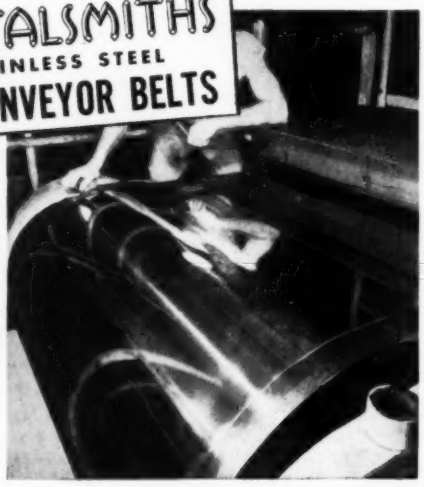

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Kitchen

(*Continued from pp.* 104-5)

designing any more plastic items. A molded phenolic base for a display fixture which I designed was one of the largest pieces produced up to that time. Other problems were clock cases using vanity sets of cellulose nitrate, jewelry and novelties of cast phenolic resins, radio cabinets, cosmetic containers, and numerous other items such as lighting fixtures. New materials were appearing on the market and there was much excitement concerning them.

Surely neither I nor anyone else designing plastic wares at that time had any idea of the extent of the bright new world that was opening up before us. The war, however, put a temporary stop to the procurement of tools, and my designing of plastic items was reduced to the fabrication of merchandise out of sheet, rod, and tube stock only. The lack of metals gave this business great impetus, and the market was saturated with a flood of cigarette boxes, trays, brushes, combs, mirrors, powder boxes, picture frames, and a hundred and one other miscellaneous items.

I am simply overwhelmed by all the developments of the last ten years. The bewildering array of variations in every type of plastics is enough to confound anyone, even an expert. I am reminded of an article I wrote in 1935, "Making the Most of Materials," in which I predicted that refrigerators, sinks, various types of cabinets including those for radios, and even bathtubs, would some day all be made of plastic materials. For this I was called a crackpot.

From here on in, anything can happen, and nothing will surprise me. Again, war needs have given an impetus to new uses. Designing goes on. Every new market in every field —from gifts to buildings—gives evidence of a great deal of design effort. Plastics is the one field in which there is no tradition of craftsmanship as in ceramics, glass, or metals. They cannot be interpreted by artisans because of the very nature of the materials, but must be designed and engineered for mass production.

Stabilization of the entire industry from laboratory to molder has given the designer a great opportunity to use his imagination boldly, restrained

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only by the existing limitations of the molding and fabrication of the material itself. There are a large number of factors to consider in the design of plastic articles, some of which are the following:

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Plastics do not provide the appropriate answer to every problem of industrial design and production.

Their properties and variety bring new freedom to designers.

The control which the designer can exercise on them is a severe test of his imaginative powers.

A new public attuned to change and receptive to new ideas is establishing itself in a post-war world. They expect, and are encouraged to expect, more agreeable environments.

The chemist, the manufacturer of materials, and the fabricator, together with the industrial designer, must work as a team to fulfill these expectations. There has been a deplorable tendency on the part of many designers to reproduce traditional forms in plastics, particularly in furniture. That phase seems to be gone now, and for the most part the approach to plastic design is fresh and better controlled.

The wide range of plastics applications gives the designer great scope, from kitchen appliances and table accessories to furniture, flooring, wall coverings, lighting fixtures, bathrooms, and so forth. Some day when the building codes in certain areas are relaxed to permit the use of plywood or other plastics bonded panels with insulating cores, we shall see entire housing projects using plastics materials from cellar to attic. Durable, bright, cheerful, individual, and reasonably priced houses will be the result. The designer is limited only by his imagination, within the realm of new and old materials. As soon as the chemists and technologists produce the needed materials, the designer will be able to convert them into products which people want and need. As these materials are made in greater abundance, costs will be reduced in proportion which will allow still greater application of plastics in everyday life. The designers' creations will keep up, every step of the way.—END

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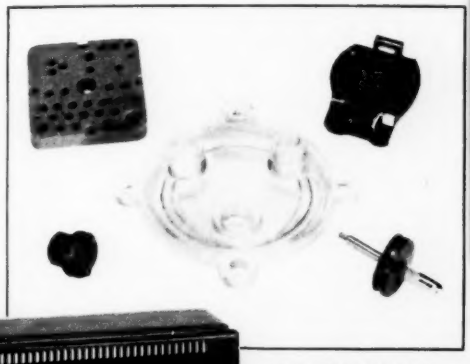

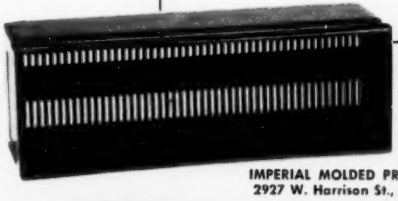

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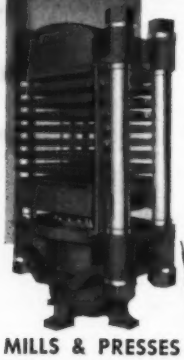

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Cellulosics

(*Continued from pp.* 108-9)

it possible to combine a number of functions in a single cabinet, eliminating the need for accessory fixtures and thereby cutting both material and labor cost. Note, for example, that the light fixtures on either side of the mirror are an integral part of the unit. A toothbrush rack has been built into the medicine cabinet door, also a dispensing unit for tissues, and a "catch-all" drawer in the front of the cabinet.

A small section of the top shelf on the cabinet for the storage of dangerous drugs and poisons puts them safely out of the reach of children in a compartment fitted with a snap lock. Rounded corners and rust-proof, chip-proof surfaces make the unit easy to keep clean. The structural design is such that rigidity of the unit is assured; the high-impact strength of the cellulosic material makes the cabinet durable; and the rich range of colors afforded by plastics will make possible the availability of high-styled bathroom fittings even in structures where cost is the prime factor. Compact and light in weight, the unit is practically designed for ease in shipment and installation.

Another broad new field for molded plastics in large sections is suggested by the sketch of the doll carriage. It is obvious that this same idea would readily adapt itself to the development of an even larger unit serving as a low-cost baby carriage. It would offer such important features as surfaces which are completely sanitary inside and out, a colorful finish of extreme durability that cannot peel or wear off, and a toughness and impact strength which would assure a long service life. From a manufacturing point of view, assembly would be extremely simple, low in cost, and, if desired, the product might be designed for knock-down shipment. Plastics materials are ideal for mass markets, and here is a typical field where the mass-production possibilities of molded parts might revolutionize both quality standards and merchandising techniques.

The large molded sections which can be produced on some of the newer injection molding machines suggest many uses in the furniture

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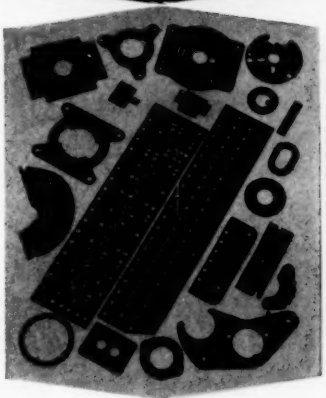

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Tumb-L-Matic's "Pushbutton" Processes – equipment, compounds, and techniques – AUTOMATICALLY add the finishing touches to an appealing product sales picture...and at a substantial savings. These processes provide closer control over finishing operations...enhance the saleability of your plastic products by lowest-cost, high-speed definning, cutting, smoothing, and lustering operations. When properly applied, they eliminate costly buffing...free vital manpower for more productive work.

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FORMERLY LUPOMATIC INDUSTRIES, INC.

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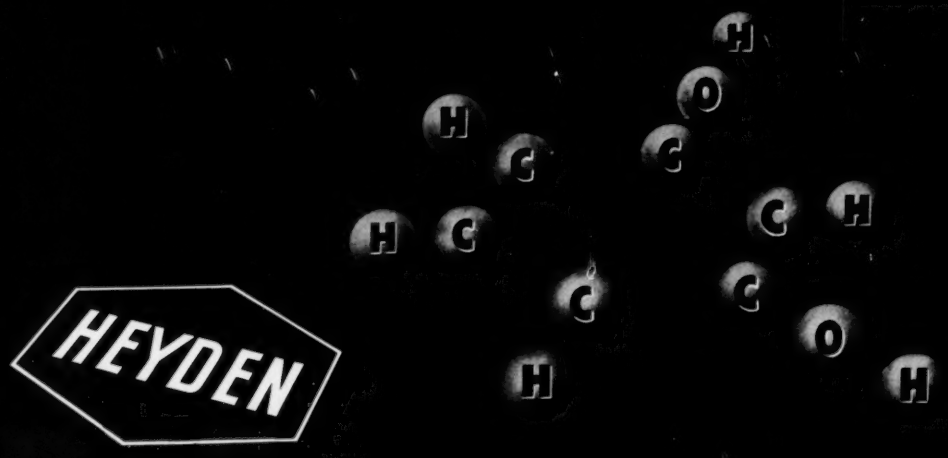
industry and large new potential markets in a field where plastics to date have lacked any real exploitation. In all applications in this field, plastics must expect to compete with wood—a comparatively cheap and abundantly available material. Certain features offered by molded plastics sections will offer material and labor saving economies that must certainly offset the handicaps which up to this time have ruled plastics out of most furniture design. One good example of a unit of furniture which successfully combines large molded sections with metal in a well-styled, functionally sound item of modern furniture is the folding chair. Both the seat and back are designed to be molded with a cellulosic material around a metal core. The metal legs and support for the back section might be either aluminum or nickel-chrome on steel. Note how the contour of seat and back sections are designed so that the chair folds into an unusually small and compact unit ideally adapted for storage or shipment. Production problems are limited to the injection molding of the plastics sections and the comparatively simple fabrication involved in the forming of the metal supporting parts. As a result, many expensive steps which would be involved if either wood or fabric were employed have been eliminated. Color possibilities are unlimited and are available in a rich, lustrous finish that will not fade, peel, or wear off.

Even in a discussion of this type, where the consideration is confined to a single group of plastics materials, it is not possible to more than barely scratch the surface of the design potential involved. In the short time that we have worked on the design and development of new cellulosic products, we have seen important improvements in the quality of these materials and dramatic strides in the direction of better techniques for converting them into finished products. Today, we can plan to do many things that only four short years ago would have been considered unwise—even impossible. Within the next few years, it is reasonable to expect that the application range of these versatile plastics will be further broadened.

The wonderful thing about plastics is that the materials themselves, as well as their markets, are continually growing and expanding.—END



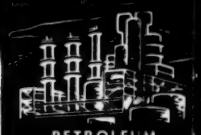
A Chemical of Many Uses . . .

DYES

PHARMACEUTICALS

EXPLOSIVES

COSMETICS


PETROLEUM

LEATHER

RUBBER

PLASTICS

ADHESIVES

Resorcinol is an extremely versatile chemical manufactured by Heyden in various grades to serve in the many applications of importance to industry, some of which are listed here:

PHARMACEUTICALS: In manufacture of antiseptics, antipruritic ointments, scalp preparations, etc.

DYESTUFFS: Intermediate for Eosines, Resorcin Browns and Greens, Erythrosines and other dyestuffs and developers.

SYNTHETIC RESIN ADHESIVES: Resorcinol-formaldehyde resins which set rapidly at room temperature, giving a waterproof, fungus-proof bond.

RUBBER: Resins for improving the adhesion of rubber and textiles.

In addition to the above uses, Heyden Resorcinol goes into the manufacture of plastics, textiles, tanning agents, explosives, antioxidants, and many other important products.

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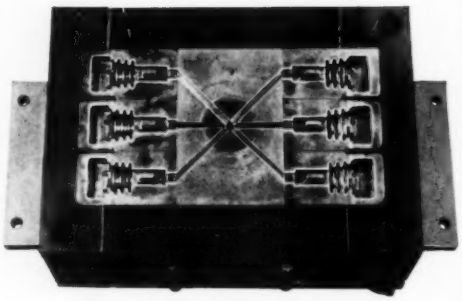
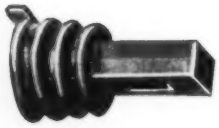
are you paying a premium for plastic molds?



Every time molded parts are rejected, unsatisfactory finishes jeopardize sales appeal, or a mold causes production tie-ups, you're paying through the nose. You'd be surprised how many buyers of plastic parts are paying a premium—simply because they figured on saving a few pennies on mold costs. What's the answer? Simply this: If you buy plastic parts outside, put the molding job into the hands of a custom molder backed by a skilled moldmaker.

Good molds actually *cost less* on the long pull. For the reputable molder and moldmaker not only start with the best steel—but invest extra care and skill to meet your exact requirements. Result: *dependable* molds that run longer, impart better finishes, reduce unit costs.

For years, skilled molders and moldmakers have staked their reputations on Carpenter Electric Furnace Mold Steels. They find it pays in many ways to buy from Carpenter—*specialists* in mold steels. The Carpenter Steel Co., 112 W. Bern St., Reading, Pa. Export Address: The Carpenter Steel Co., Reading, Pa.—"CARSTEELCO"



When you have mold work done outside, consult a custom molder backed by a reputable moldmaker!

Write for useful leaflet on Samson Extra!

NEW JERSEY TOOL & DIE CO. made this electronic tube support mold for MACK MOLDING CO. SAMSON EXTRA provided good hobbing qualities, high strength, and good machining. And on job after job, SAMSON EXTRA's long production runs help the molder meet today's demands for higher output with a greater percentage of quality parts.

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GUARANTEED CLEAN DIOK SOUND UNIFORM

100% Acid Disc Inspected

Concepts

(*Continued from pp.* 112-3)

foot use could be secured to the floor and recessed to a point above the bottom inner liner radius to keep the cracks off the floor and reduce ledges to a minimum. The floor is easily cleaned because it has radii in all directions and is entirely unobstructed. The base of the inner shell is ribbed on the under side to give rigid support to the floor.

Two molded shelves are attached to the liner and, in addition, a shelf on which to rest packages is attached to the back of one door. When not in use the shelf automatically returns into a recess. Both the shelves and the phone are adjustable in height depending on whether the booth is to be used for sitting or standing. Ribbing on the back side of the inner liner in the area in which the telephone is mounted insures sturdy support for the instrument. The easily removed illuminated acrylic sign provides ready access to the ventilating chamber.

Ticket Booth

In the design for an attention-attracting ticket booth, which could just as easily be an information or display booth, you will recognize the same basic structure as in the telephone booth. There is only one change. We now have a short molded door with a counter molded on top. Such an adaptation, because of the increased volume, would help the manufacturer absorb tool costs and assist in lowering his general overall costs.

Garbage Container

The attractive design for a garbage container, like the booth, is possible only through the use of laminated fibrous glass reinforced plastics. Some of the advantages of this molded container are that it would not rust or corrode; there are no seams to collect and harbor filth and bacteria; all corners would have large radii, making it easily cleaned. Because of the material's high impact strength, these containers could take the abuse and rough handling to which they are ordinarily subjected . . . and take it without being beaten and battered out of shape.

The handles are designed to be molded of the same basic materials

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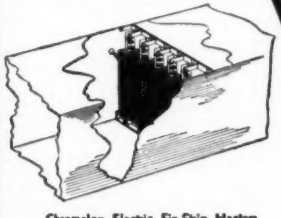
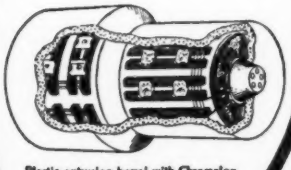
TYPICAL APPLICATIONS



Chromalox Electric Fin-Strip Heaters mounted in air ducts.



Plastic extrusion barrel with Chromalox Ring, Straight and Curved Strip Heaters.

1C-89

Easy to Install CHROMALOX Electric Strip Heaters give clean, dependable and accurately controlled heat. They are widely used in platens, dies, kettles, tanks, ovens, air ducts and other applications requiring accurate temperature control and around-the-clock service.

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and are cemented in position to meet shear and tensile strength requirements. These handles permit complete gripping around without abrasion to the knuckles. The contours of the container are designed to nest for shipping and storage. A square container with its more efficient use of space is just as feasible in reinforced plastics as a round one would be. Permanent molded-in color permits identification and would certainly give more attractive appearance than the customary garbage can. The lid is easily removed by the collector but does not have to be removed each time the user deposits the garbage. It simply rocks open a given distance and then drops back to the closed position.

Any comparison of costs of this new, practically indestructible container with the present comparatively short-lived hot dipped steel cans must be made on the basis of life expectancy, very likely in excess of ten years compared to two or three for traditional garbage cans.

Design Creed

The objective of design is to sell merchandise. To meet this objective, due regard must be paid to economics, material properties, processing technology, and market acceptance. Analysis of every design project requiring selection of materials and processes reveals self-imposed limitations. I do not go against the nature of materials and processes but select them for their inherent qualities in order to capitalize on their characteristics to get maximum performance with a minimum of means.

Included in my design philosophy are the following objectives:

1) To produce a better product at a lower cost, a more rugged yet a more refined product; to get the most out of materials and processes.

2) To achieve simplicity of manufacture. Each part designed so that in itself it will be simple, will embody fundamental fitness, will be of satisfactory material, and will be manufactured by the process embracing the latest proved technological developments.

3) To use every possible legitimate device to urge a purchase on the part of the prospective buyer — ease of maintenance, effective appearance, favorable sensory reaction, safety, pride of ownership.—END

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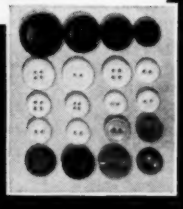

This compact automatic machine punches fins and cleans holes of Urea, Phenol and Melamine buttons.

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- COMES IN 3 SIZES
  - MODEL S ACCEPTS SIZES 12 to 34
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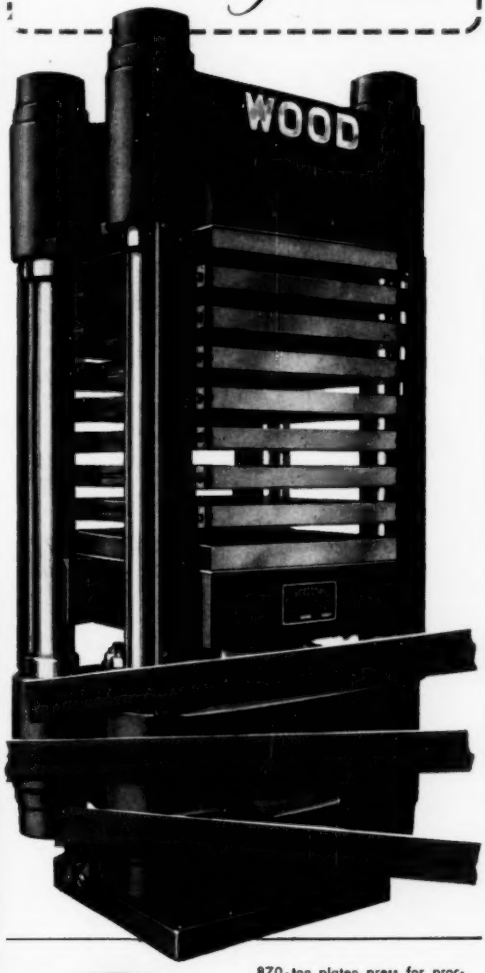

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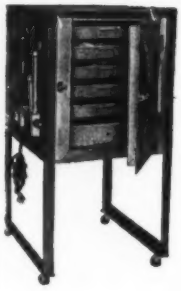


MODEL NO. 1

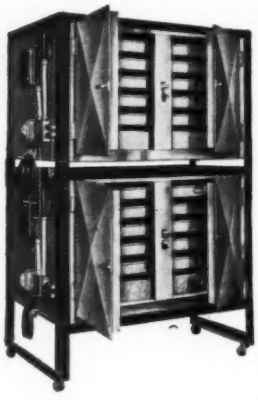
Single Door: Width 24½" Five trays 15" x 22" x 2½" Height 50"—Depth 28½" Heating Element 1800 watts. Thermostatic Control 100° to 300° F.

MODEL NO. 2

Double Door: Width 48" Height 50"—Depth 28½" Ten trays 15" x 22" x 2½" Heating Element 3600 watts. Thermostatic Control 100° to 300° F.

MODEL NO. 3

Double Decker: Width 48" Height 68½"—Depth 28½" Twenty Trays 15" x 22" x 2½"

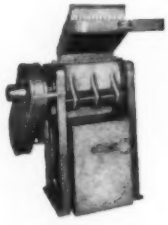


Model No. 3 is two Model 2 units placed one above the other. They can be operated independently of each other and the top unit can be used in reverse position whenever desired.

RUGGED, made to last . . . EFFICIENT, economical to use

The trays are of such size and design to hold approximately 10 pounds of the average material when placed to a depth of about one inch. Special trays of expanded metal allowing greater circulation of heat can be supplied and are recommended for the pre-heating of pellets and other solid objects. For special uses the trays, or the entire unit if required, can be made of stainless steel, monel metal or nickel. Sturdy in construction, built of steel sheeting, carefully and thoroughly insulated with rock-wool insulation placed between the inside and outside shells of the dryer. Mounted on casters for easy movement from one location to another in the plant. Each unit is equipped with thermostat to automatically control temperature of the oven. A light indicates when unit is in operation.

• JUST PLUG IN AND TURN THE SWITCH



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For the uniform grinding of Vinylite, Geon and all hard thermoplastics. Capacity: 200 lbs. per hr. 3 H.P. motor with double V belt drive. Four Steel Chopper Blades. Roller Bearings with Positive Seals. Screen with ¼" openings.

DE MATTIA *Bench Model* GRANULATOR

For *at-the-machine operation* (Can also be supplied with base for floor mounting). Capacity: 75 lbs. per hr. 2 H.P. direct connected motor. Roller Bearings with Positive Seals. Screen with 11/32" opening.

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TELEPHONE DIGBY 9-3600

Seating

(*Continued from pp.* 114-5)

any direction even though the shoulders and back are completely supported.

In designing a chair based upon the above principles, two important factors had to be taken into account: flexibility and durability. Flexibility is a prime consideration because it is impossible to find a true average to take care of all sizes and shapes of people. For this reason it was decided to make this chair in from three to six seat sizes. However, it was found that the chair frame need not be made in more than one size, if the legs are accommodated to people with long or short legs. Durability, of course, is important in order to resist rough handling, and to reduce maintenance costs.

Helen Merit

Taking all these facts into consideration, a fibrous glass reinforced polyester laminate was selected for the entire frame. The portion of the frame supporting the seat and back is to be molded into one unit with varying cross-section shapes and thicknesses for increased strength. The legs, of the same material, are designed in several sizes which are easily interchangeable. The legs are tipped with metal feet which may be adjusted to any irregularities of the floor and will keep the chair level and stable. The glass reinforced polyester material was selected because of its great strength, lightness, rigidity, and permanent color.

The suspension seat must be made of a material that breathes, is flexible and durable. Here it was decided to use canvas with a light protective application of a dispersion of vinyl-chloride acetate. This material is durable and can be tailored to the necessary shape. Since the seats are applied by a very simple method, the different sizes may be quickly interchanged, and, for immediate identification, each size has its own color. There are several other materials, including woven saran, which could later be used for the seat, but which are yet in development.—END

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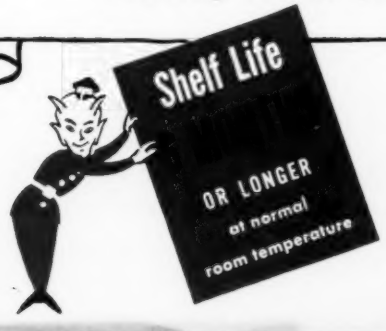

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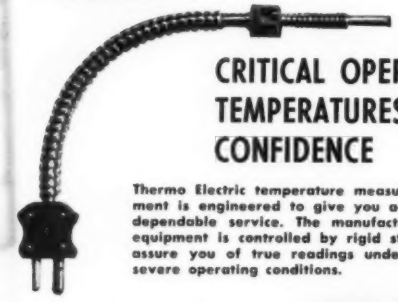

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STillwell 6-6200

(*Continued from pp.* 128-31)

used to produce lower cost silicone type material that can be molded, laminated, or coated. Furthermore, it may be used to modify other plastics to give them properties approaching those of the silicone resins themselves.

POLYESTERS

So many future possibilities have been predicted for polyester-glass that almost anything said here would only be repetition.

Expert opinion of the fabricators and the confidence of producers who are building new plants to make more resin and reinforcing glass indicate that the day of real triumph for the reinforced plastics may be near at hand. Military and naval technicians kept interest alive in dull days because they saw promise of a product ideally suited to many of their purposes. Most of their dreams are still in the developmental stage, but if war breaks out tomorrow, a lot of those dreams will soon be converted into actuality. Lightness, structural strength, corrosion resistance, and electrical properties are some of the things they like about polyester-glass.

"Announcement of a polyester that will withstand 500° F. makes it even more attractive for . . . applications pertaining to the electrical, radio, and television industries."

Boats and More Boats

Some of the possible polyester applications that may be expected in war time are boats of all descriptions—even up to 100 ft.; pipe; water tanks; certain types of barracks; missile parts; carrying cases; typewriter cases and field desks; storage racks; landing mats; glazing; body armor; sleds; truck bodies; and even more airplane parts. It's an imposing list. If only a few were actually put into full scale production, the manufacture of polyesters would have to be increased many fold.

Recent announcement of a poly-

Write for literature describing:

1. Heavy Duty Engravograph (illustrated) Catalog H 20
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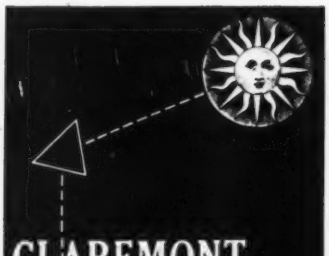

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Brooklyn 11, New York

ester that will withstand 500° F. makes it even more attractive for some of these purposes and for civilian applications in the electrical, radio, and television industries.

Civilian applications have been comparatively slow, but it seems reasonable to assert that the big day of polyesters can't be too far off. Such things as the present pipe and glazing products are only infants on the way. Refrigerators may be next. Chemical tanks; electrical appliance housings; pottings for such things as terminal block castings and magneto coils; battery cases; venetian blinds; and structural sections for at least portions of buildings may be on the way. The body of the much talked about plastic automobile seems most likely to be in polyester when actual commercial production really starts. There is almost no limit to the kind of housing or structure that can be built when cost is reduced enough to make this material more competitive with other building materials. The transportation industry alone could use thousands of tons of polyester if it becomes competitive with metal for such things as trucks, buses, and railroad equipment.

Another building possibility is that polyester will soon prove itself as a glaze coating—in color—for cinder blocks. The plastic will thus upgrade the lowly cinder block into a colorful, high-grade, low-cost building material of vast potential.

POLYETHYLENE

Trying to guess the range of new products in which polyethylene will turn up is like trying to guess how many beans there are in a jar. When the material went on allocation, there was a long parade of people to Washington trying to get material for all sorts of things that not even the polyethylene producers knew were in existence. There is hardly a field where thermoplastics can be used that won't be entered by polyethylene—and a lot of new ones to boot. Temperature happens to be one limiting factor, but maybe that's good; it gives other materials a chance!

A great expansion for polyethylene in metal coating, including pipe, is a cinch. Large containers and vats are presently coated by processes

(*Continued on p. 224*)

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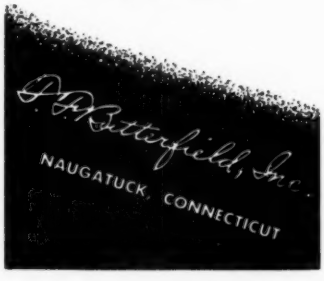

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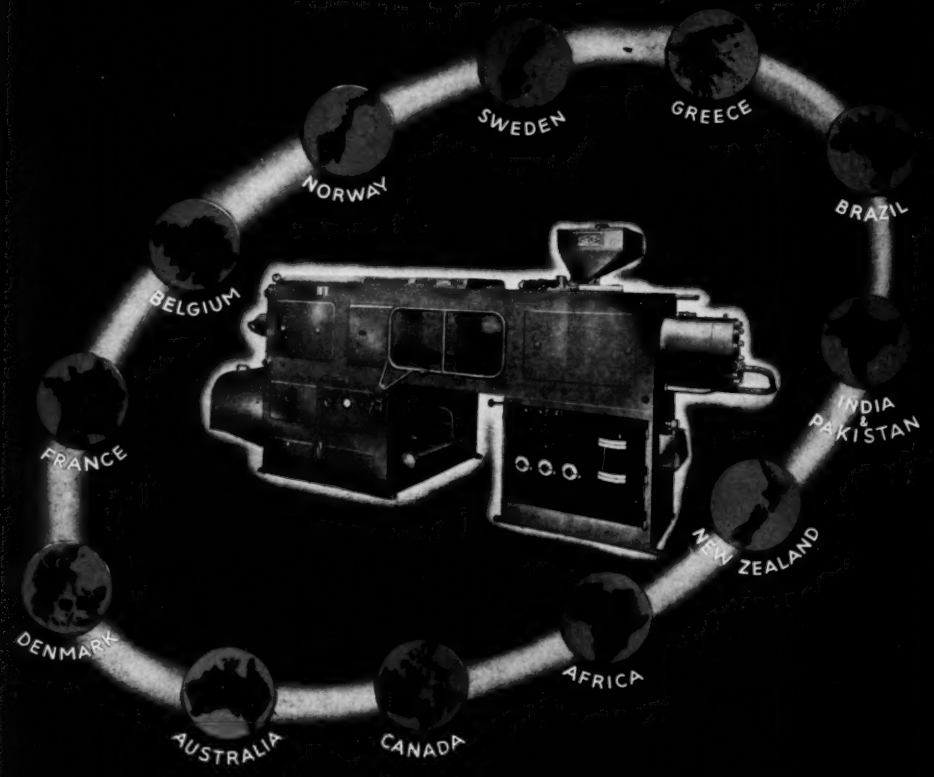

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POLYETHYLENE FOR CORROSION RESISTANCE. Explanation of use of flame-sprayed polyethylene to protect metallic surfaces from corrosive action. Test data indicates the effectiveness and limitations of polyethylene coatings. Linde Air Products Co., Div. of Union Carbide and Carbon Corp. **(C-203)**

SILICONE RUBBER PARTS. Folder tells about a specialized service for fabricating various industrial components from silicone rubber. Chart lists standard grades and properties. General Electric Co. **(C-204)**

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MOLD ENGRAVNG. Reprint from MODERN PLASTICS covers the various phases involved in machine and hand engraving of plastic molds. Newark Die Co., Inc. **(C-218)**

MOLDING FACILITIES. Custom molder's services described from design of product to finished molded parts. Erie Resistor Corp. **(C-219)**

CARBON BLACK. House organ includes data on uses of carbon blacks, and other articles of interest to the plastics and allied industries. Witco Chemical Co. **(C-220)**

INJECTION MOLDING MACHINES. Photographs and basic specifications of the complete line of Lester injection machines ranging from 4 to 48 oz. in capacity. Lester-Phoenix Inc. **(C-221)**

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allied to flame spraying, but greatly improved techniques will develop. Coated metal collapsible toothpaste tubes are already on the way.

Coating on paper-board cartons for milk and other liquids seems assured. Coated building papers to replace tar paper are now in limited use and expansion is waiting only for more polyethylene. Polyethylene wall paper is not unlikely—one problem would be the material's low rate of moisture transmission which impedes the drying of conventional pastes. Use of an anti-static agent would prevent dirt attraction.

It's Handy Stuff

Polyethylene for sale as yard-goods in stores will require thousands of pounds. It can do a lot more jobs around the house, or on the farm, than serve as a wrapper for refrigerated or frozen foods. Temporary storm windows; windbreaks for plants; wrappers for storage of tools, woolens, rugs, etc.; makeshift rain capes—these are just a few. Mama can use it for curtains, tablecloths, aprons. It's handy stuff.

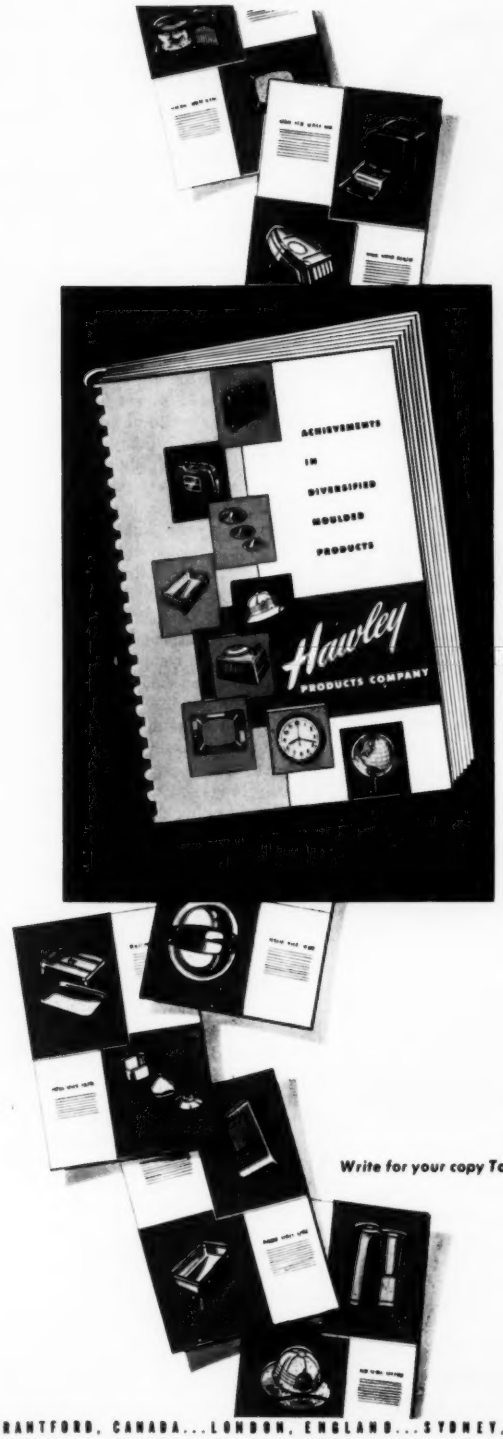
As mentioned earlier, the use of polyethylene as piping has only begun. It is now being tested for use in radiant heating for homes and in snow-melting systems. Temperature is no problem, because temperatures used in radiant heating are relatively low. Lightness of weight and ease of installation are advantages.

"Perhaps a low-cost chlorinated polyethylene will eventually be developed. When it is . . . the market will be broadened more than ever."

There is a likelihood that polyethylene will be used in cold water piping in rural areas. Building codes may keep it out of American cities, but it is being used widely in England where metals are really scarce.

Polyethylene piping is being used in municipal water systems. It doesn't have to be put in deep trenches to avoid freezing, because freezing water won't burst it. When necessary, it can even be laid on top of the ground.

The trend toward unbreakable big bottles or carboys is just a beginning. There may be some delay in



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medicine bottles until tests have proven which pharmaceuticals can't be packaged in polyethylene, but the day is coming when the dangers of broken glass jars will be a memory.

More Polyethylene Toys

Within a few years there is going to be such a plentitude of molded polyethylene toys that father and mother won't even have to think about broken bits and sharp edges. The toy makers are really beginning to rave about this.

Perhaps wire insulation and kindred uses will be near the biggest volume use of all. Even polyethylene insulated power lines are not beyond the realm of possibility.

Packaging of dusty materials in polyethylene is another prospect. The attempt to package carbon black in polyethylene fell on evil days for a time, but it will be back, and similar jobs will be possible.

And perhaps a low-cost chlorinated polyethylene will eventually be developed. When it is, and the material gets an improved surface, as well as flame retardance, the market will be broadened more than ever.

The possibility of calendering polyethylene with or without an adhesive backing is also bright. If and when that happens on a big scale, such things as camel-back wrappers, pipe wrapping to prevent corrosion, and electrical splicing tape will be available in huge quantities.

NYLON

Few people realize the gains that such things as molded nylon gears and bushings have already made in the automotive industry—and they can be much bigger.

The food processing industry is expected to increase its demand many fold for such things as molded nylon agitators, cams, bearings, and gears. Many operations in this industry are performed in the presence of various kinds of fluids which cause corrosion and lubrication troubles when metal parts are used. Nylon is not subject to corrosion; in addition, the very fluids which cause difficulties with metal are good nylon lubricants. Furthermore, nylon is non-toxic and sterilizable. It is economically sound in these applications because it is readily molded.

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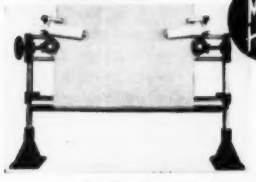

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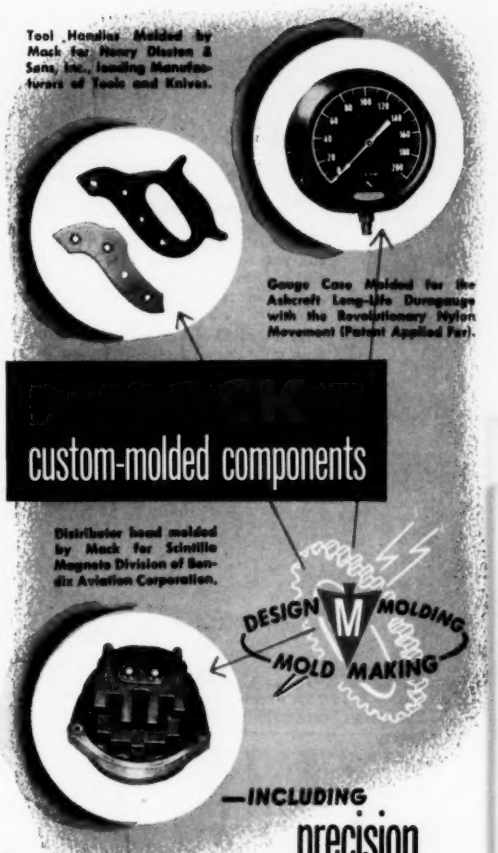
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nylon in business machine parts is well known. This is only a forerunner of the many hundreds of applications that are due to follow not only in business machines, but in all precision mechanism parts.

In the Body

In medicine and surgery, nylon has long been known as a suitable material for sutures and hypodermic needle parts. It is now becoming recognized as a promising structural material in orthopedic surgery and prosthetic devices. Its reported tolerance by human tissue is one of its outstanding characteristics in this field and is a factor which also is bringing it into use in plastic surgery as a replacement for body tissue; the nose bridge is one example.

A growing use of nylon is expected in electrical current-carrying equipment of normal domestic voltage. Electrical engineers are aware of its value and it is one of the few thermoplastics that the underwriters will approve for such use. The softer types of nylon in the newer formulations are coming into use as leather and rubber replacements. The use of alcohol-soluble nylon in the textile field as a finish for women's hose will increase.

"Nylon is not subject to corrosion; in addition, the very fluids which cause difficulties with metal are good nylon lubricants. Furthermore, nylon is non-toxic and sterilizable."

The food industry is making its first concerted wide-scale evaluation of nylon for processing—such as cleaning and peeling—fruit and vegetables for canning and/or freezing. The Army and Navy are now working on some 22 miscellaneous aircraft applications. Included are such things as connector and terminal blocks in the electrical field, bushings, instrument parts, hydraulic seals, rub blocks, wear strips, precision bearings, and gears.

Paint Brushes

The use of nylon monofilament in paint brushes is fairly large at present, but is due for big increases when the preference of master painters for hog-bristle brushes is

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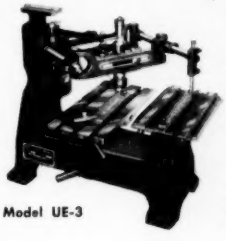

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eventually overcome. It seems that it takes from 20 to 30 years to overcome a painter's prejudices. New techniques for grinding bristle ends have resulted in the creation of a new and much better nylon master painter's tool, and tests indicate that it will perform as well as the best brush of Far Eastern hog bristles—and it will last at least three times as long.

Some analysts have estimated that the use of molded nylon three years hence may well exceed 50 million lb. annually.

PHENOLICS

Where is all the phenol going that will be produced in new facilities now being planned? The same question was asked at the end of World War II when production capacity had been raised to over 20 million lb. a month. New plans call for a production capacity of over 50 million lb. a month by 1954 or '55.

The new increment was requested mostly by actual users of phenol; chemical companies are not prone to build plants to make materials that won't be used. Heretofore they have generally been on the short rather than the long side.

"Most of the new phenol is ticketed for production of phenol-formaldehyde resins . . . Big upsurge in industrial resins."

The interesting angle in this speculation is that most of the new phenol to be produced is ticketed for production of phenol-formaldehyde resins. Molding compounds are expected to show a good growth, but the big upsurge is expected in industrial resins that are used for such things as shell molding, wood treatment, binders, abrasives, adhesives, coatings, and foam.

Much Larger Parts

In the molding category, it is expected that larger press capacities, together with medium and low pressure compounds, will make possible the production of much larger parts. Television cabinets are only the beginning. Phenolic air conditioner housings are expected to be

HELPFUL BOOKLETS FREE!

SARAN PIPE AND FITTINGS. Folder covers applications, chemical resistance, and available varieties of "Mills Plastic" pipe, pipe fittings, tubes, and tube fittings. Elmer E. Mills Plastics, Inc. **(C-212)**

PRECISION FILM GUIDES. Bulletin gives data on guiding equipment for maintaining accurate lateral alignment of web materials and films. Price list included. Mount Hope Machinery Co. **(C-214)**

INJECTION MOLDING MACHINES. Photographs and basic specifications of the complete line of Lester injection machines ranging from 4 to 48 oz. in capacity. Lester-Phoenix Inc. **(C-221)**

"DIAFORM" WHEEL FORMING ATTACHMENTS. Bulletin describes a light-weight portable attachment for use on conventional grinding machines for forming and re-truing of complex forms on grinding wheels. Pratt & Whitney, Div. Niles-Bement-Pond Co. **(C-230)**

INJECTION MACHINE. Descriptive folder on the 4-oz. Lewis injection machine for molding pieces with large projected areas. Lewis Welding and Engineering Corp. **(C-242)**

Any of the booklets described here plus many others—forty-four in all—are available for the asking, without charge or obligation.

Just turn to the Manufacturers' Literature page in this issue (it's printed on heavy coated paper), circle the numbers corresponding to the booklets you want, fill in the reply postcard, and mail. No postage needed.

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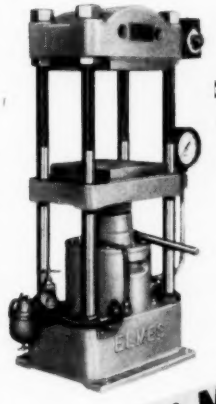

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in large production very soon. Dehumidifier cabinets may be next. Ventilating fan housings and fan blades; dispensing machine housings and parts; new textile spools and bobbins; various types of furniture and component parts are in the works. Greater use of component parts used by plumbers is seen in the crystal ball. Such things as water heater pipes, heater housings, and radiator covers are new fields where phenolic compounds will be introduced in the near future.

Phenolic-rubber compounds are just getting started even though they are several years old. Then, too, a small percentage of resin is used in rubber for shoe soles, sponge rubber, etc. It's quite a market for resin already and may get larger, since it adds hardness and other desirable properties to rubber.

The entire phenolic molding future may be considerably expanded when molders start showing their customers how economical this material is in comparison to metals.

Glass-Phenolic

Phenolic-filled glass with three to four times greater shock resistance than generally found in filled phenolics is also on the way to market. It would be principally an industrial application material wherever great strength is required.

Powered phenolic resins have for some years been added in the beater in making pulp preforms or sheets which are later molded. More recently, liquid phenolic resins have been developed for the same purposes. Papers having special properties may thus be produced. In the future it is possible that paper containing sufficient resin for use as the core stock in decorative laminates may be produced more economically in this way than by the customary method of impregnating the finished sheet of paper with an alcohol solution of resin. The use of phenolic resin in paper, now that it can assertedly be done with less color darkening problems, has by no means reached its peak.

Industrial Laminates

The expected growth of decorative laminates is discussed under melamine. Up to now, at least, these laminates require a phenolic core; that means a lot of phenolic for this business alone. The industrial lami-

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nating market has a ceiling on its volume, based on the out-turn of manufactured products using laminated moldings as components. Thus, the regular type laminate growth may be limited by the growth of other industries. Laminators think they have found most of their market applications, except possibly in such things as textile machinery.

But this market may be expanded by new type laminates with new resins such as silicones and higher heat-resistant phenolics. Perhaps the rubber-phenolics which increase impact of conventional molding powder by five to ten times may also be used in laminates and reduce price by making it possible to use lower cost fillers or reinforcements. On the other hand, fillers such as glass, nylon, Orlon, and unwoven fabric will doubtless be used to produce specialty high impact laminates. Their potentialities have been scarcely investigated to date.

Mica paper, using crushed mica rather than segment type, is another new possibility for high temperature electrical use. With a high temperature resin it would approach flameproofness. The search for laminates with greater chemical resistance and flame retardance goes on apace. Every advance means more volume for laminates.

High pressure laminated wood also has some interesting possibilities. In the cutlery handle field it may take up to 75% of the business. For heavy duty flooring, it may prove practical in many cases. While it costs more than concrete, tests indicate it will stand up much longer. House flooring with a wood grain paper laminate adhered to low cost lumber as a base is also an interesting possibility.

In the Foundry

Shell molding, whereby sand cores in foundries are bound with phenolic resin, threatens to revolutionize the foundry business. One authority says that automobile companies alone would use over 100 million lb. of resin a year if they converted to the new method. It may take five or ten years to realize full volume for this application, but it's the biggest new thing proposed for phenolics in a long time. Something like 120 automotive parts are under study for precision casting by this new method. Some engineers

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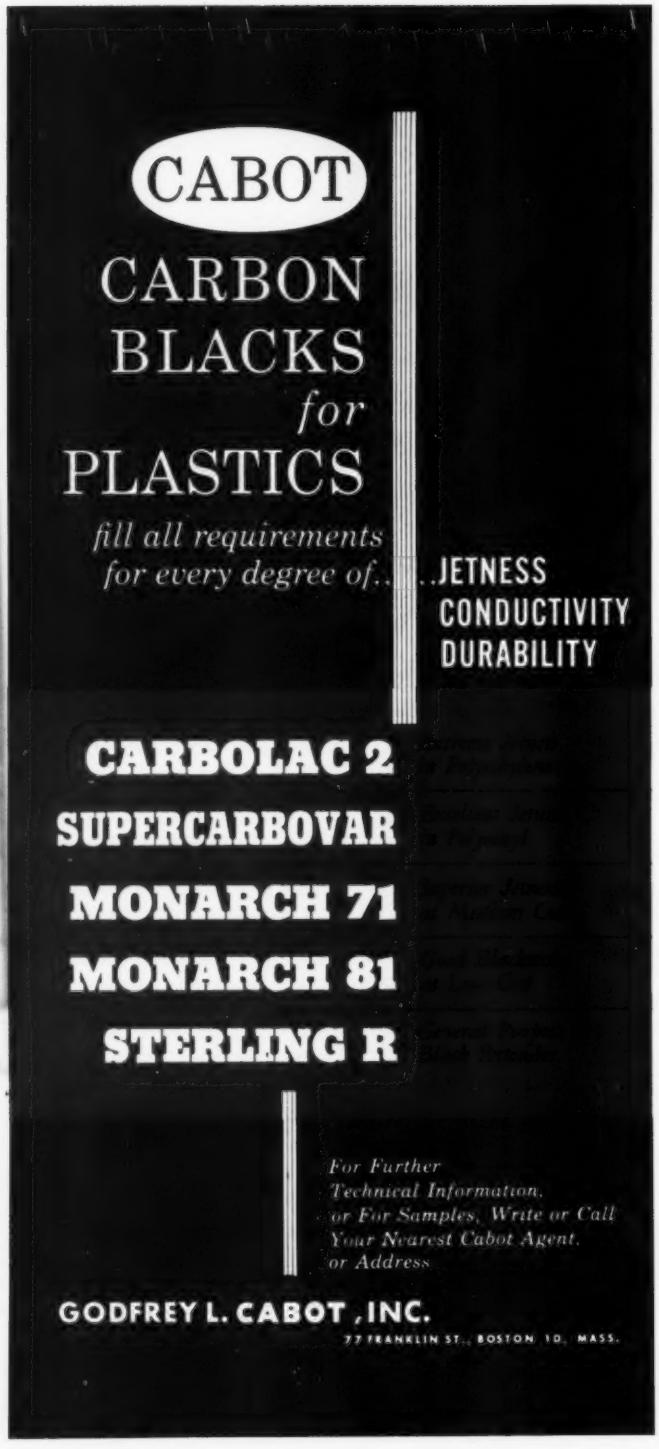

predict that it will even make possible the general use of air cooled automobile engines.

One phenolic producer says the same system can also be developed or molding finished items. An example would be molded sand-urea flower pots which, when placed in the ground, would disintegrate and the urea would become fertilizer.

Phenolic resin core binders for the cores used inside castings are also going to increase in volume, says one producer.

Wood and Phenolic

The treatment of wood waste with phenolic resin has barely gotten under way. Estimators predict that the volume of resin used in this way may go over 50 million lb. in a few years. Doors and panels are obvious applications. Electroplate bases are already in production.

Resin adhesives used in plywood and laminated wood showed the greatest percentage of gain of any phenolic resin last year. The very use of the resin is making lumber go much farther than ever before. Patching and bonding of formerly useless pieces of wood does the extending job.

Part of the increased use of phenolic comes from increasing production of exterior plywood. Phenolic adhesives must be used for this grade; even for interior grade there is a trend toward the use of an increasing amount of phenolic with blood-derived glues. The military is making extensive use of plywood construction in housing. Big corporations with developments in tropical countries are beginning to use it for housing because of resistance to fungi, insects, and earthquakes. Railroad freight cars and trailer liners are all using more. Today there are only a few square *feet* of plywood per room in a modern house compared to the number of square *yards* that will be found five years from now. Phenolic impregnated paper facing on the outside surface and specially prepared alkyd finishes will add to the attractiveness of plywood construction for outdoor paneling on homes. Many experimental houses are now under test and all reports on progress are good.

Laminated wood for trusses is becoming more and more useful. Resorcinol and phenolic combinations are necessary because the layers of

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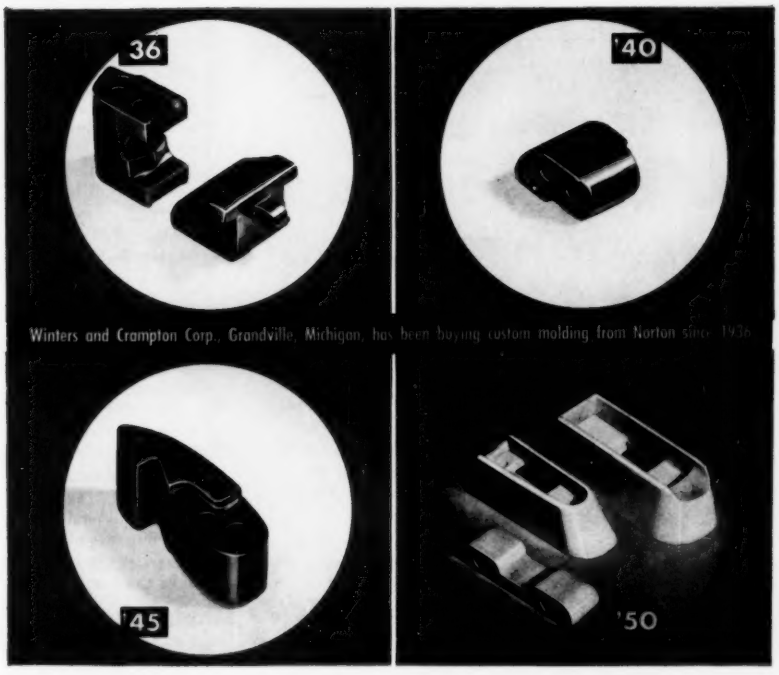

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wood must be glued together without heat and resorcinol does the trick. The Navy is building scores of laminated wood boats; each requires a large quantity of resorcinol and phenolic glues.

The increasing use of this type of structure in the future should not be overlooked. It is stronger than steel by weight and is highly fire retardant. Strangely enough, it has often proved more satisfactory under flame conditions than steel.

It has been pointed out that plywood or laminated wood could well do the job of much of the metal used in the following military applications which have been contracted for by the Government:

Readiness hangars; trusses and plywood siding; truck bodies; field chests; Quonset type huts; warehouses; freight cars.

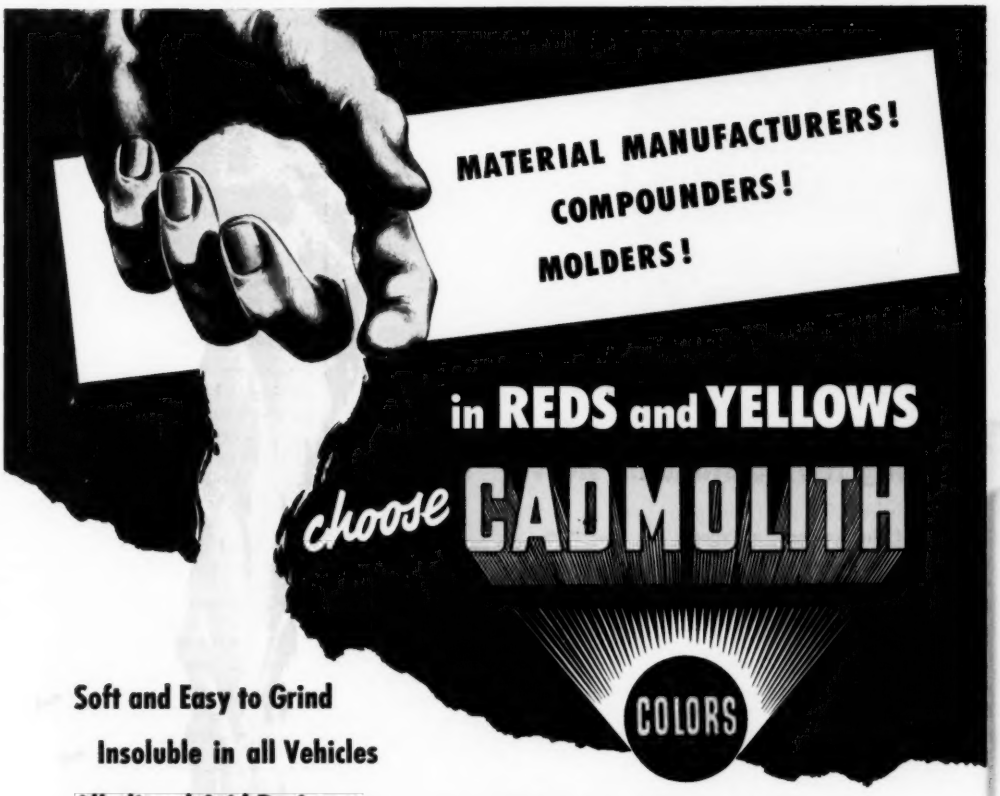
Among the plywood jobs which the Armed Forces are using are various types of boxes and crates; even pallets for tanks that are to be dropped by parachute are being made of phenolic resin glued wood.

Phenolic resin is making wood an even more useful material than it has been in the past—and wood is going to continue to absorb more resin than it ever did in the past as technicians and users become more and more familiar with the almost fantastic things that can be done with the combination.

UREA AND MELAMINE

Those who were asked for "dreams" about future products to be produced from urea or melamine did not furnish much inspiration from that angle, but all are expecting expansion of items now in production. Behind this confidence there is unquestionably a change coming in the future price structure of melamine and urea as compared to competitive materials. Heretofore, both urea and melamine have had to compete with lower priced plastics, but there are many hints and indications that that situation is going to level out within the next few years.

Melamine prices, for example, have not been raised in ten years. The prices of nearly all other plastics have gone up and the margin between melamine and the lower cost materials is getting smaller and smaller. Furthermore, production is



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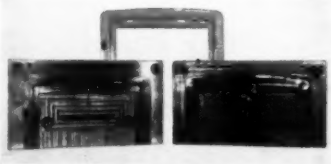

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steadily on the rise and lower prices generally follow such a trend.

Urea is fundamentally a low-cost material produced from two inexpensive chemicals. Urea glue sells for around 15¢ a pound. A new urea in black and brown, lower in cost than most any other plastic, is now ready for exploitation. It is advertised largely for electrical applications, but is deemed suitable for buttons and closures as well. Molders will probably find lots of other uses; they can't overlook that price.

Low Cost in Color

However, the most startling news coming in by way of the grapevine, but certainly from an authoritative source, is that low cost urea in color —maybe as low in cost as the brown and black—is certainly on the way. It would be alpha-filled and supposedly far superior to the low cost wood-filled colored urea now produced in other countries. Repercussions will be felt not only in the thermosetting industry, but also in the low-cost segment of the thermoplastics industry. Of course, the phenolic people have also been doing research on a colored product for years too, but there hasn't been a peep out of them for a long time as to their progress—perhaps cost is so far an unconquerable factor.

"Both urea and melamine have had to compete with lower priced plastics, but . . . that situation is going to level out within a few years."

Even if low cost colored urea fails to materialize, urea producers continue to emphasize color to expand their present markets—especially in electrical wiring devices for the home, radios, toilet seats, and other bathroom accessories. A colored urea wall tile with a hard surface that won't pick up dust is expected.

Melamine expansion is expected to continue in electrical equipment and possibly in low pressure molding with glass. If another application which requires the volume of material consumed by dishware comes along soon, more capacity for melamine resin will have to follow.

The use of melamine and urea in textiles to prevent wrinkling and

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Power Data—Power Requirements: 230-volt or 460-volt, 60-cycle, 3-phase. Power Input: 6.3 KVA at 90% power factor. Power Output: 3 KW.
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Molders of Plastics for over a Quarter Century

shrinkage, and in paper to give wet strength, is not new but is due for considerable future growth. Melamine is one of the chemicals frequently talked of that may make deciduous woods as useful as coniferous for pulping purposes and thus help eliminate the danger of overcutting our coniferous forests.

Melamine decorative laminates have far from reached their ultimate application. With the new simulated wood finishes and possibly a printed textile filler, they are moving from the kitchen to other parts of the home. Wainscotting, wall covering, some types of furniture for every room of the house, doors, and numerous other types of indoor furnishings are in the docket for future acceptance.

CELLULOSICS

Butyrate pipe is in one of the fastest growing fields for molded or extruded cellulosics today, but largest expansion of all is expected in film. Prepackaging of food is the chief reason. Acetate is admirably suited for this purpose in many individual cases.

One company reports that their production of thin acetate film will attain a rate in 1952 of 300% over early 1951. New colors for dry extruded film will open new markets. There will be increasing quantities used for pressure sensitive tapes of all kinds for packaging, recording, and electrical purposes. The government will take large quantities for barrier wraps, laminated foil, and ordnance uses.

EPOXY RESINS

Epoxies are too new and scarce for a definite view of just where they are going, but one user predicts a future as bright as for any resin that has come along in the past five years. So far, they have been most widely publicized as coating materials and as adhesives that will stick almost anything to anything. Their use for adhering metal to metal, glass to metal, etc., is well known. In protective coatings they resist alkalies, acids, and most other chemicals. Their potential use in industrial items requiring these properties is big.

In potting compounds, epoxies have proved superior for electri-

You—and
Reinforced Plastics!

There probably is an application for fiber glass reinforced plastics in your products. It may replace a metal part. It may eliminate several pieces in an assembly. It may be an entirely new part, needing the remarkable new characteristics of fiber glass reinforced plastics. In any case, it will mean a better product and a saving for you.

But . . . the molding of fiber glass reinforced plastics, contrary to some beliefs, is a difficult business. Proper applications, proper die design, and low cost high quality products have been accomplished only by specialists devoting their entire attention to this field.

We are the world's largest custom molders of fiber glass reinforced plastics. That, alone, is our business. A number of companies are now trying to enter the reinforced plastics field; many without experience, without the very specialized equipment needed, and without the undivided attention of top management. Lacking these qualifications, they may make improper applications of the material plus mistakes in part and die design, all of which will mean production delays, unnecessary expense and disappointment. There have been many cases where a potentially good application of reinforced plastics has been dropped because of the inexperience of the molder.

We will be happy to examine your potential applications for fiber glass reinforced plastics, without obligation. Whether we make your parts or not, we do not want to see failures in this field by anyone. Fiber glass reinforced plastics is a remarkable material, but only when properly molded and applied.

MOLDED RESIN FIBER COMPANY
World's Largest Producer of Fiber Glass Reinforced Plastics
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See us at Booth 1401, ASTE Show, Chicago, March 17-21, 1952
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TOOL STEEL

Our reputation was built on tool steel . . . and that means that when Crucible puts mold steel in the same class as tool steel — *you* benefit!

You benefit these ways: we've assigned an experienced metallurgical staff to help you with your plastic mold problems; we back every pound of steel with over 50 years of specialty steel leadership, and we have stocks available from warehouses strategically located from coast to coast.

Crucible mold steel *is* better. It's tool steel.

WRITE TODAY FOR YOUR TOOL STEEL SELECTOR

Get your copy of the unique Crucible Tool Steel Selector — a quick twist of the dial gives you the right tool steel for the right job. And will help in the selection of mold steel. Selector has 9-inch diameter; printed in 3-colors.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

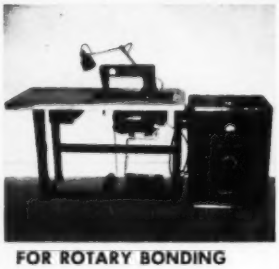
MOLD STEEL

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

Mayflower

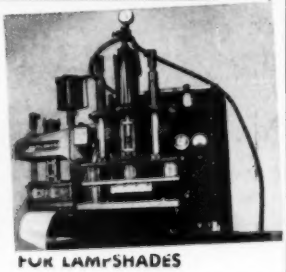
Complete plants designed and built for commercial manufacture of raincoats, curtains, inflatables and other plastic film items

Mayflower analyzes the available space, plant layout, materials handling, work flow, processing equipment and packaging and shipping . . . then we build the complete plant for you—carpentry, wiring, plumbing, installation of high speed Mayflower electronic bonding equipment . . . everything. Your employees can walk in and start production.



FOR ROTARY BONDING

This Mayflower electronic sewing machine is available for single or dual wheel applications. Seals film and sheet up to 50 ft./min. Binds, hems, straight seals or turns.



FOR LAMPSHADES

While standard equipment can often be used for sealing plastic lampshades, this Mayflower generator with two specially designed presses proves more efficient and economical.

At the Show you'll see Mayflower's important new developments in electronic sealing equipment.

VISIT BOOTH 528

Mayflower ELECTRONIC DEVICES Inc.

6014 Hudson Boulevard, West New York, N. J.

cal equipment because they don't shrink. Their use here is just beginning. They may eventually be used in glass laminates where their no-shrink and chemical and water resistance properties are wanted.

Together with other materials, epoxies may eventually get into deck compounds, a product which Ameri-

> **"One user predicts a future (for epoxy resins) as bright as for any resin that has come along in the past five years."**

can industry has been trying to improve for years. They will thus be used on shipboard, in sugar refineries, paper mills, and many other places where men have to walk over slippery, greasy floors that are a hazard to life and limb.

VINYL CHLORIDE AND COPOLYMERS

Vinyl chloride is close to being the most versatile of the plastics. It can be calendered, spread coated, cast, extruded, molded, dip coated, solution coated, expanded, or used as a surface coating. It can be used in a hard, soft, or medium state. Some people are alarmed lest, when capacity reaches 600 or 700 million lb. a year, the market will be saturated, but the very versatility of the material and its scarcity almost ever since 1943 has prevented research for vast markets which have yet to be explored.

A textile executive says he has seen synthetic fibers grow from 25 million lb. to a billion lb. in 20 years; he thinks the same thing could happen in synthetic leathers and coated fabrics. And they would be mostly vinyl.

New Look in Carpeting

Floor coverings of a type far different than any of the hard surface vinyls now well known may become big volume if certain surface characteristics can be overcome. They will simulate actual carpeting or heavy rugs and will be particularly adaptable for hotels and commercial houses.

Upholstery for cars, buses, and trains, as well as for office and home furniture, is only in its infancy. A

(*Continued on p. 248*)

Exclusive

COLOR OVERLAY
PRINTING
COLORED PRINT BASE
CORE
By the simple addition of this sensational and exclusive overlay paper you can add amazing new sales appeal to your product.

Only HURLBUT can offer you this striking "overlay method" for product improvement!

The greatest development since laminates, in colors to enhance most popular wood grains. Hurlbut's new decorative color overlays add color, beauty, and a three dimensional effect heretofore unattainable in laminates. They increase the character of the product but maintain the abrasion resistance and other properties associated with regular overlay.

The practical effect is not to be overlooked . . . acting as a protective coating, but TRANSPARENT, Hurlbut overlay lengthens the life of the design and protects it from stains and wear on laminates . . . Dining Tables . . . Cabinets . . . Walls . . . Occasional Furniture . . . Conference Tables.

Write for further information today — let us tell you more about this simple method of adding dollar value to your product at a negligible cost to you.

*Don't underrate conventional alpha and synthetic white overlays for pastel patterns and general work. Woodgrains and deep color designs are the forte of the colored overlays.

Hurlbut

PAPER COMPANY

South Lee, Massachusetts

COMPLETE PROCESSING LAYOUTS
Engineered by Farrel-Birmingham

For many years Farrel-Birmingham has made a specialty of engineering complete setups for processing plastics. The two schematic arrangements shown here are typical examples of this service.

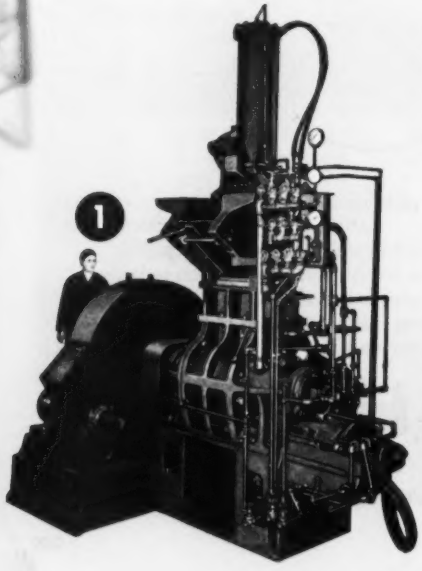
Hand-tailored for specific sets of conditions, these layouts are composed of production units, designed for most efficient step-by-step conversion of raw material to the finished or semi-finished product. These machines are then *matched in capacity* to prevent the "choking" or "starving" of succeeding units. Production flows without costly interruptions and with manual aid and supervision reduced to a minimum.

Farrel-Birmingham engineers will be glad to discuss the possibility of improving your production efficiency or cutting your handling costs through planned processing flow. Write for further details of this service or for general information about any of the production units described in these pages.

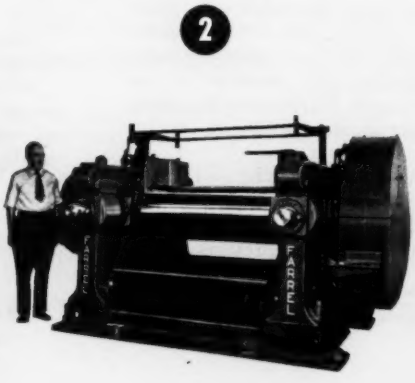
FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, New York. *Sales Offices:* Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

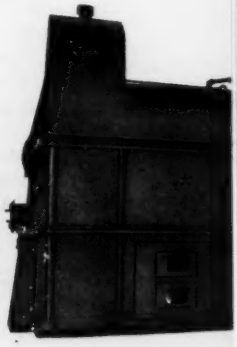
Farrel-Birmingham

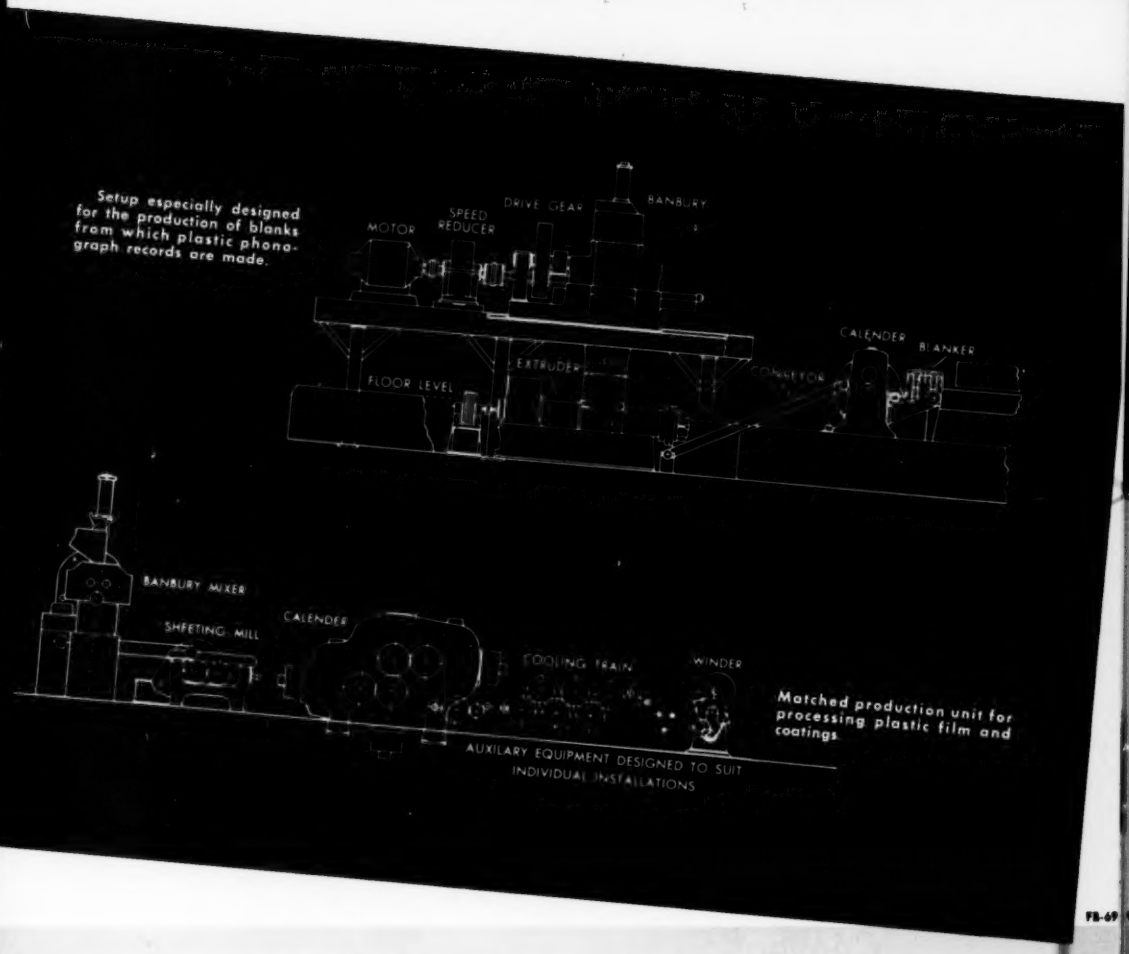


1. BANBURY MIXERS are widely used in the processing of plastics. They produce uniformly mixed stocks of superior quality, with reduction in production cost and elimination of dust and fume hazards. They are made in six standard sizes for processing plastics, from the size B for laboratory use to the No. 11 with a chamber capacity of 14,940 cubic inches. Banbury mixers are described in detail in Bulletin No. 189.



2. MILLS—Farrel-Birmingham mills provide close temperature control and accurate gauge where these are required. They are available in a complete range of sizes, from 6"x13" for the laboratory up to 28"x84" heavy





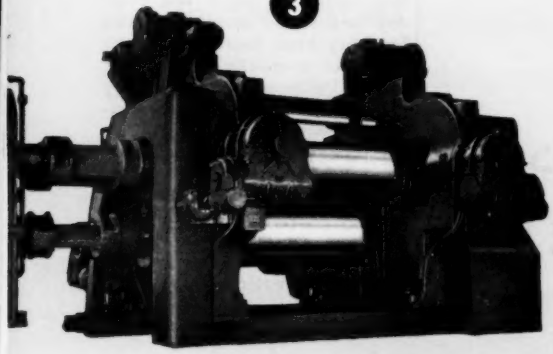
FB-69

duty machines for the factory. For special requirements, variations in designs are obtainable, often from existing plans. Bulletin No. 173 gives full details of Farrel-Birmingham mills.

3. CALENDERS—Farrel-Birmingham calenders are designed for continuous high-speed operation and the accurate control of gauge required in calendering plastics. From the small laboratory units to the huge production machines, every detail is designed to fit the calender for the work it has to do. Available in both Z-type and inverted L-type. Calenders are described in Bulletin No. 174.

4. EXTRUDERS—Farrel-Birmingham plastics extruders are screw type machines designed for continuous mixing of the various powders or granules that go into numerous thermoplastics. They combine and work partially preblended mixtures of resins, fillers, plasticizers and coloring matter into a homogeneous mix in a single pass and extrude the stock in a continuous strip. They are available in 6", 8½" and 20" sizes.

3



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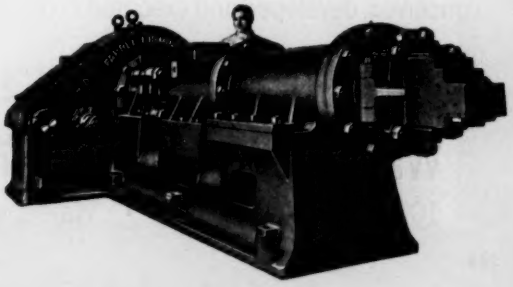

furniture man says leather upholstery costs $7.75 a sq. yd.—best quality vinyl costs $3.05. Other types are available under a dollar a yard.

Uses for Thin Film

Very thin film may be available for home storage as protection against moths and dust; for protection of men's shirts when traveling; for keeping dirty shoes away from other garments in a traveling bag. It could be used as a garbage pail liner. A thin film lining converts any ordinary box into a water-tight container. Outdoors, the film can be used to protect plants or seeds from frost or birds.

The packaging properties of vinyl have been somewhat overlooked in the past because there wasn't much thin film available and there were certain physical disadvantages to be overcome. Nevertheless, its protective values are top-notch and must gain more attention in this field.

"Today's vinyl compounds may be completely obsolete within a few years . . . A whole host of new brothers and sisters in the polyvinyl chloride and vinyl-chloride-acetate family."

One of the most interesting uses now under way is the process whereby vinyl is used to coat automobile fabric upholstery at the textile plant. The protected fabric is then shipped to automotive plants where the coating is stripped off after the upholstery has been installed. This coating eliminates all the fuss of handling wrapping paper and is cheaper. When stripped off, the vinyl can be reconverted to do the job over again. This same idea could spread to a consumer type of auto upholstery cover and could well be used as a protective coating for fancy hand bags and women's shoes. It's essentially the "cocoon" process for protecting laid-up Navy equipment, modified to meet consumer needs.

It is probable that the use of vinyl film in food packaging will reach its zenith in combination with other plastics, particularly in lamination, employing the mechanical strength of vinyl together with the gas permeability and water vapor transmis-

There's not room enough here to picture for you samples of all the types of custom molding we have accomplished for our customers.

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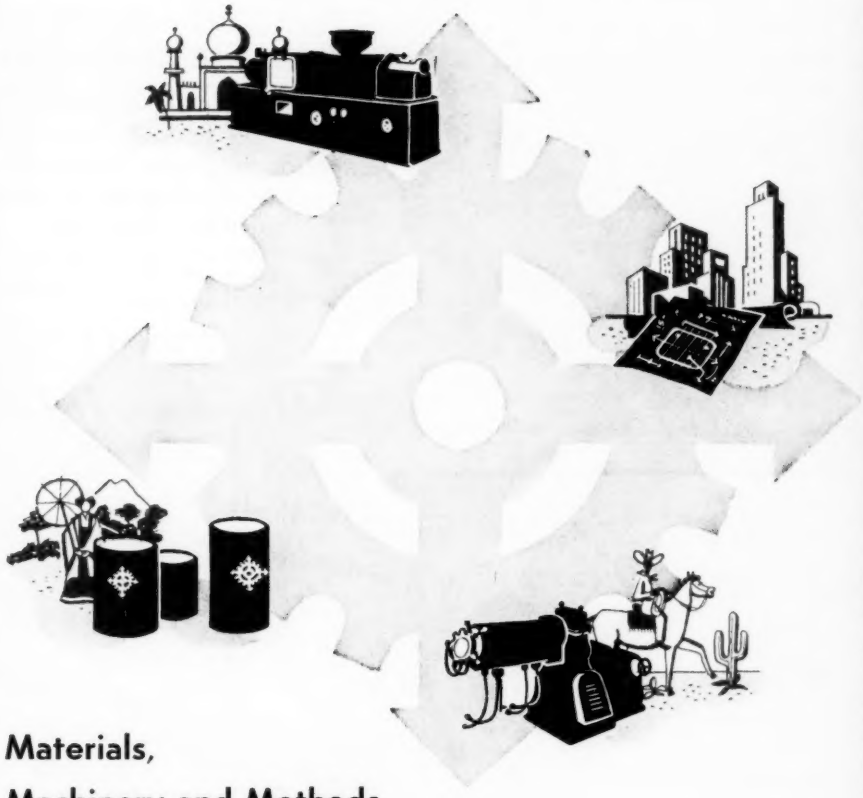

Materials,
Machinery and Methods
for the Plastics Industry

OMNI PRODUCTS CORPORATION

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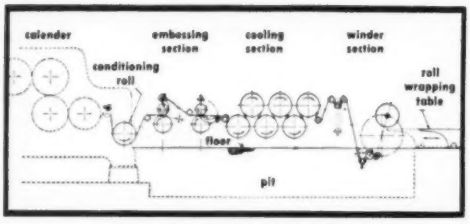
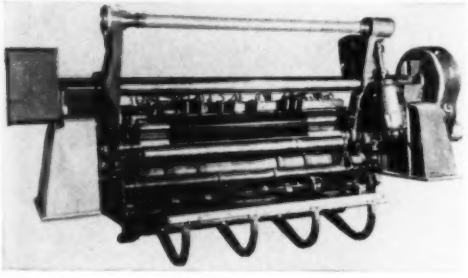
Dilts



Complete Plastic Take-offs



Kohler Model 40-S Continuous Winder

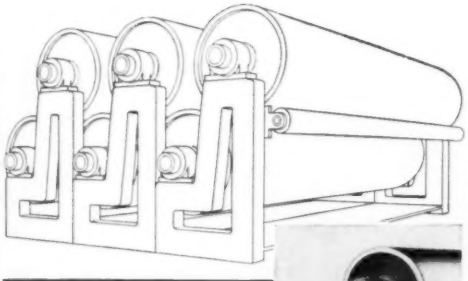
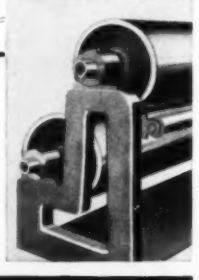


Photo drawing of Cooling Train



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Div. of The Black-Clawson Co., Inc.
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INORGANIC PIGMENTS
for plastics

PERMANENT • DEPENDABLE
RESIST FADING AND HIGH TEMPERATURES
INSOLUBLE IN SOLVENTS and PLASTICIZERS

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No matter what your dial requirements may be, it will pay you to consult Sillcocks-Miller. Their experience, facilities and precision techniques will help you solve present metal shortage problems.

Write for samples and quotations.

The **SILLCOCKS-MILLER** Company

Pioneers in Plastic Fabrication since 1910

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sion of various materials. Such a combination could eliminate the need for metal foils.

Vinyl on Metal

Either plasticized or unplasticized vinyl is possible as a 4- to 8-mil coating on metal. The coated metal could be used in fume ducts, drum liners, funnels, tank linings, and other plant equipment where corrosion is a problem. Gutters and downspouts can be made from it. Gasoline tanks on cars and trucks made from this material would be less costly than the metal alloys now used. It might be used as flooring in freight cars and trucks.

It is visualized that the bonding of the steel and vinyl would be done right in the steel plant in a continuous operation.

Another contributor suggests that this same type of application has already been started by dipping or spraying vinyl surface coatings on steel plate. Business will be good in this line before long.

Rigid vinyl in sheet or molded form has reached only a fraction of the volume it will attain. Piping has already been mentioned. Commercial relief maps at a nominal price have just started. Structural sheet, however, is the big possibility. Ducts for chemical plants are an obvious application. Partitions, liners for vehicles, small outdoor structures, possibly even shingles, tractor seats —wherever sheeting is needed that must withstand the effects of weather without corroding, rigid vinyl is a possibility and in many cases will compete with other plastics sheet.

It is also possible good markets will be found in flame spraying of heavy coats on vats, tanks, and outdoor containers where good weathering is a necessary property.

Plasticizers Will Diminish

As rigid vinyl becomes better known and knowledge of how to use various copolymers with vinyl becomes more general, use of plasticizers in all vinyls will probably diminish and some of the problems attached thereto will vanish.

Molded vinyl, both elastomeric and rigid, has had little chance to get going because engineers have concentrated on other facets of the vinyl industry. Slush molded plastisols are well on their way, but processors are so busy working on

PLASTICOR

MODEL C-2

thermoplastic injection press

¼ Ounce Capacity
•
Up to 150 Cycles Per Hour
•
Easily Operated by Semi-Skilled Help Operator Changes Molds
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Inexpensive to Operate
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Ideal for—

Experimental Short Runs • Color Testing • Small Precision Parts • Novelty Items • Hobbiests • Small Gears • Nylon Bearings • Patterns For Castings • Optical Parts • Dental Laboratories and Hundreds more

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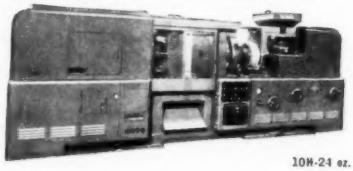
A PLANT MAINTENANCE MAN SAYS:

MARVEL SYNCLINAL FILTERS ON OUR MACHINES GIVE US TWO TO THREE TIMES MORE OPERATING TIME BETWEEN CLEANINGS

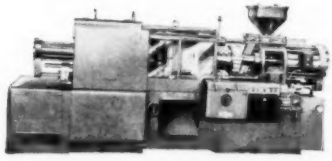
MR. A. NEUMANN,
Assistant Superintendent of Maintenance, Superior Plastics division of Commonwealth Plastics, Inc.

HERE IS WHAT HAPPENED AT SUPERIOR PLASTICS

Superior Plastics, Division of Commonwealth Plastics, Inc., using many injection molding presses in 8 oz., 16 oz., 22 oz., and 24 oz. sizes, has installed Marvel Synclinal sump type filters in their machines. All of these machines are hydraulic. Mr. Neumann summarizes the amazing results: "Since installing Marvel filters we are able to operate our machines for four to six months before cleaning filtering units as against two months with the former filtering equipment. This gives us two to three times as much production between cleanings. Furthermore, cleaning the Marvel is so simple and easy that we disassemble, clean, and reassemble it in minutes, a difficult procedure with the previously used filters."



10H-24 oz.



10D-8 oz.

Illustrated are two of the many Reed-Prentice injection molding machines used at Superior Plastics, division of Commonwealth Plastics, Inc. Photos courtesy Reed-Prentice, Inc.

MAINTENANCE TROUBLE? PRODUCTION LOSSES?

PUMP FAILURE • LEAKY VALVES • EXPENSIVE REPAIRS • DOWN TIME

75% OF ALL HYDRAULIC TROUBLE IS CAUSED BY DIRTY OIL

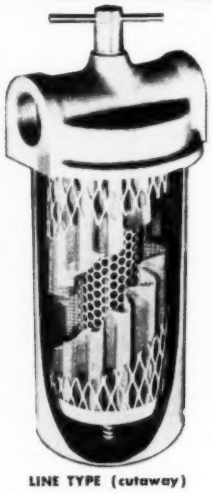
Marvel Balanced Synclinal Filters not only filter out scales, sludge and other foreign matter, but have capacity to accumulate large quantities of these destructive particles before clogging. Frequent cleaning is not necessary to prevent flow reduction in the filter. Outstanding performance ON THE JOB has made Marvel the choice of over 260 original equipment manufacturers. And outstanding performance on the job permits us to give this challenging guarantee:

MARVEL'S GUARANTEE

MARVEL SYNCLINAL FILTERS INSTALLED AS RECOMMENDED BY MARVEL ENGINEERS WILL *GREATLY* CUT DOWN YOUR TROUBLES AND PROVE SATISFACTORY TO YOU OR

YOUR MONEY BACK!

SUMP TYPE (cutaway)



LINE TYPE (cutaway)

WRITE US. State make and model of your hydraulic press. Our engineers will submit recommendations. Or ask for folder 105 giving complete engineering data. Capacities 5 to 100 g.p.m.; mesh sizes 30 to 200. Line models operate in any position and may be serviced without disturbing pipe connections.

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MARVEL ENGINEERING COMPANY
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already proved applications that they haven't had much time to think of future products.

So far, elastomeric molding hasn't done too well in competition with rubber. But competitive problems will gradually work out to give vinyl a larger share of the business.

Insulation for telephone line wire was once nearly all rubber; at present it's about 70% vinyl. Garden hose is another item where more expensive vinyl is driving out rubber. These latter two are extruded rather than molded, but they present the idea that vinyl will outdo rubber when put in the right place.

Emphasis should be placed on the conclusion that today's vinyl compounds and resins may be completely obsolete within a few years. New plasticizers that will improve flexibility as well as both low and high temperature properties, and that will resist extraction—particularly by soap and detergents—are sure to come along. Copolymers with such things as vinyl ethers, vinyl pyrrolidone, vinyl pyrridene, acrylates, maleic, and other synthetics are likely to bring on a whole host of new brothers and sisters in the polyvinyl chloride and vinyl chloride-acetate family. The rubber-like vinyl ether resins, for example, are amazingly good adhesives, particularly for pressure sensitive tape and in color, and the potentially huge plastic tape era is just around the corner.

EXPANDED PLASTICS

Here is one of the newest material forms, with exceptionally interesting possibilities for the future.

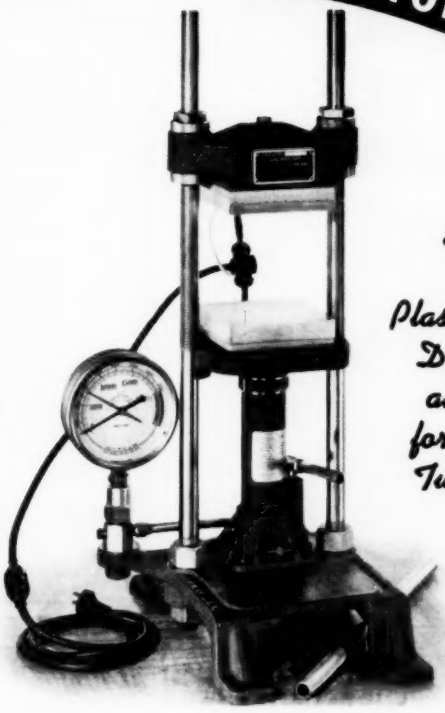
There are several distinct types—thermoplastic and thermosetting, pre-expanded and foamed in place.

Most widely used to date is probably Styrofoam—an expanded polystyrene.

Developed as an insulation or flotation material, major attention was first focused on Styrofoam in a mild way as a Christmas tree ornament. Then it blossomed rapidly into large volume use as a decorative material for windows, signs, and packaging. It is used and will grow as a thermal insulator for structural parts and as a flotation material in buoys, boats, life rafts, etc.

Prima donna of the whole lot of expanded plastics is iso-cyanate. It's

CARVER LABORATORY PRESS



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IN THOUSANDS of leading industrial firms, government and technological laboratories the Carver Laboratory Press is an indispensable aid in plastics research and development.

The Carver Laboratory Press, original in design, has long been accepted as standard for making quick, accurate small-scale tests; for development, research and instruction work; testing single cavity molds; preparation of samples, and even for small scale production. The Carver Press provides complete range of temperatures from room temperature to 400°F. Adjustable by thermo-switch to within plus or minus 2°F. Equipped with accurate 6" gauge, providing load readings up to 20,000 lbs. Low pressure gauges optional. Carver Standard Accessories include Electric or Steam Hot Plates; Electrically Heated and Water Cooled Hot Plates; Carver Test Cylinders; Swivel Bearing Plates; Cage Equipment, etc. The press and certain of the accessories are patented. Send for your free copy of our latest illustrated catalog, describing the Carver Press and some of its many applications.

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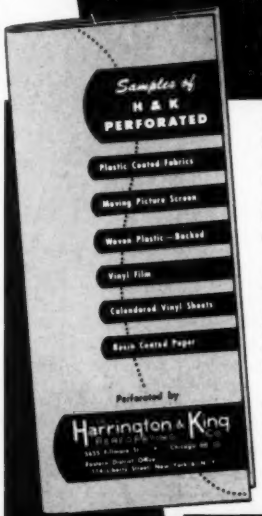

This folder of perforated swatches includes samples of various forms of plastics available as coated fabrics, vinyl sheet and film, resin coated paper and woven plastic fibers—all perforated with various sizes and spacings of holes.

The perforating provides ventilation and air escape for upholstery, sound escape for moving picture screens, light transmission for advertising signs as well as for decorative and many industrial purposes.

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expensive and scarce. As a chemical it sells for $7.00 a lb., but each pound of chemical makes several pounds of resin. Estimators say some 300,000 lb. of the chemical were made and used in 1951; the government took nearly every pound of the resin produced. Advantage is that it can be foamed in place and no adhesive is needed for adherence to side walls. As with many of the other expanded plastics, its use so far has been confined largely to filling voids in airplanes, boats, and flotation equipment. It will follow the same pattern after the emergency period; but when price comes down, it will be used as a thermal insulator in structural parts.

Already patented is a process for using iso-cyanate with Neoprene as a pre-coat to make tire cord adhere more tenaciously to rubber. Supposedly it may do the same thing for vinyl chloride. Iso-cyanate may also be used in textile work for dye intermediates and was used by the Germans for fiber. As an adhesive, it rivals resorcinol in all but cost—and some day that cost problem will be overcome. Quite a prospect—this iso-cyanate.

"It is probable that all expanded plastics will some day be tailor-made to desired specifications—hard, soft, medium, or special."

Foamed Phenolic

Expanded phenolic, either pre-expanded or foamed in place, is also a prominent contender for honors in this league. It has the big advantage of flame resistance. The Navy reports that they want an expanded plastic that has properties similar to iso-cyanate but is more like phenolic in regard to fire resistance. Flame resistance is also important to any foamed material used in civilian structural or building applications.

Like most other expanded plastics, phenolic must be adhered to the sides of a structure, generally by application of a small amount of heat. Sometimes heat is generated by adding sulfuric acid. Epon resin glues have proved to be a successful adhesive for such purposes. Presently it is claimed that expanded

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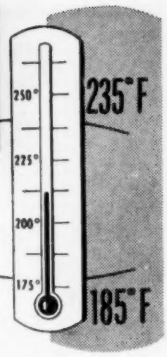

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phenolic contains acid which tends to leach out, but that factor will be remedied one of these days. In addition to its use as a thermal insulator, in flotation equipment, and as a void filler, expanded plastic is also a possible replacement for excelsior as a packaging material to save space and minimize fire hazards.

Cellular cellulose acetate is also in great demand by the Armed Services for many of the same applications named in the foregoing.

Tailor-Made Mixtures

All of the thermoplastics, including vinyl, which will be discussed later, are pre-expanded. Phenolic, iso-cyanate, and urea (whose use has been limited so far) can be either pre-expanded or foamed in place. It is probable that all expanded plastics will someday be —hard, soft, medium, or special. tailor-made to desired specifications

Expanded plastics have two general purposes when used as insulation or void filler: first, to give rigidity; second, to form a stress-skin type of structure which gives high compressive strength with low weight. Thus, with foamed plastic insulation, thinner sheets of steel might be used in a refrigerator since the insulation helps give strength. Furthermore, expanded plastics are in a sense competitors to plastic honeycomb material, but their proponents claim their materials have more insulation value.

Expanded Vinyls

Expanded vinyls are treated separately here because they have many different types of applications than those named above. In addition, they will compete in some of the previously named fields, especially where fire resistance is important.

The recently announced cold weather suit for soldiers, to be worn like underwear, is an example. In civilian life duck hunters, farmers, and wood cutters may learn to like it better than red flannels.

Rigid expanded vinyl bonded to polyester glass laminates to make a strong light sheet that floats is a development now under way. Army engineers think this combination would be suitable for foot bridges and even bridges for light trucks. It might also be possible to strap blocks or thick sheets of the material to tanks and float them across

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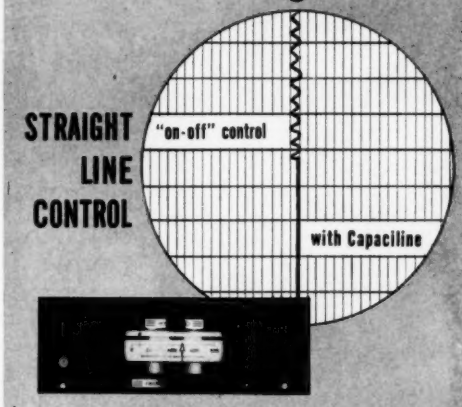

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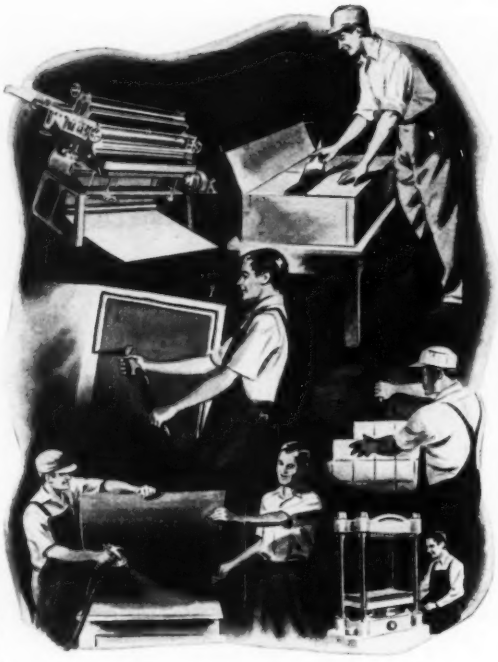

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		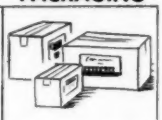
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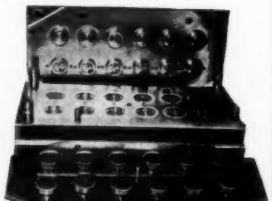

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rivers. Such sheet could be laid down over muddy areas to provide traction for vehicles.

Expanded vinyl sheet, because of its insulation value, may be used for liners in refrigerator cars and trucks. It is already being used experimentally for insulation in truck cabs designed for Arctic regions.

And like several other plastics, expanded vinyl would have value in boat seat cushions that could double as life preservers; in all kinds of buoys; in fish net floats; and in practically any flotation application.

Acknowledgments

Best thanks of MODERN PLASTICS go to the following companies and individuals who served as "contributing editors" by supplying the material used in the preparation of this article.

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Celanese Corp. of America.

DeBell & Richardson, Inc.: John M. DeBell.

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Pittsburgh Plate Glass Co.: Dr. E. H. Haux.

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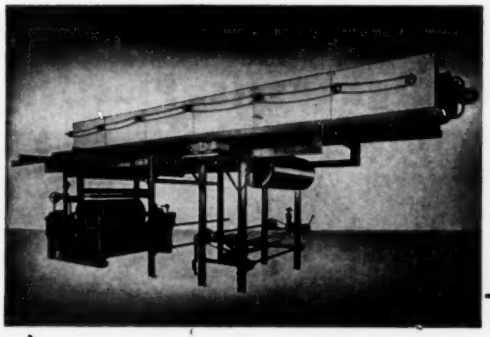

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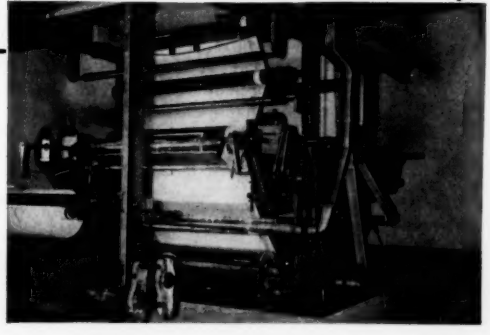
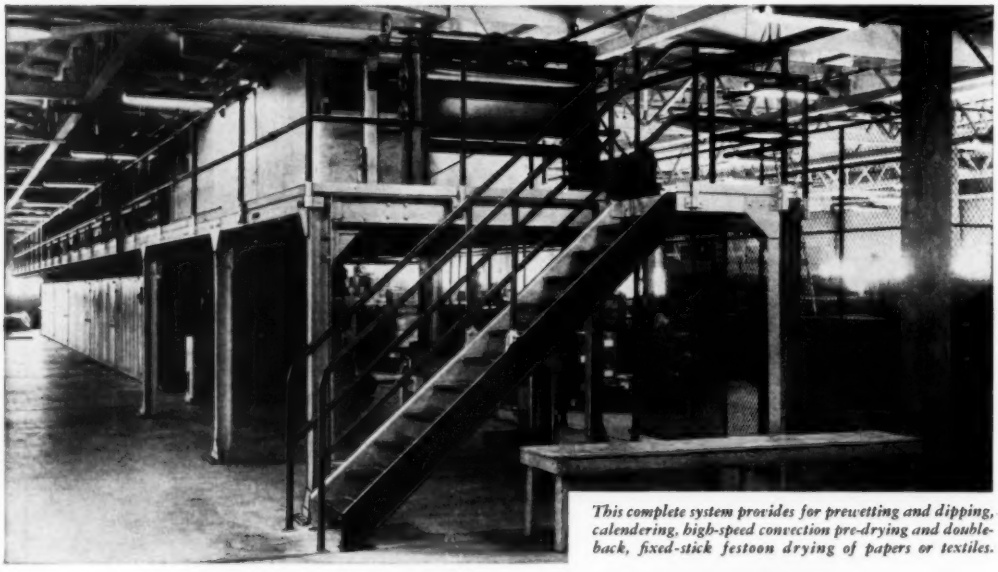
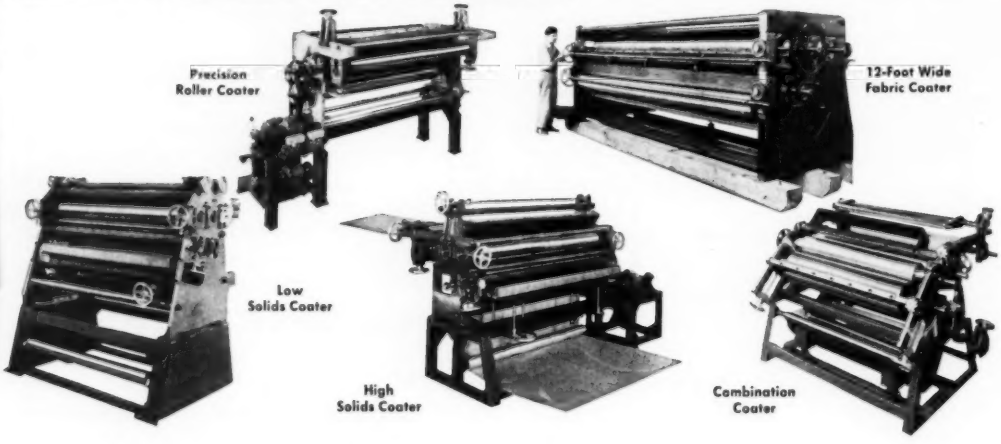


IOI Equipment for Coating Fabrics, Films and Foils with Organosols, Plastisols and Hydrosols



This complete system provides for prewetting and dipping, calendering, high-speed convection pre-drying and double-back, fixed-stick festoon drying of papers or textiles.



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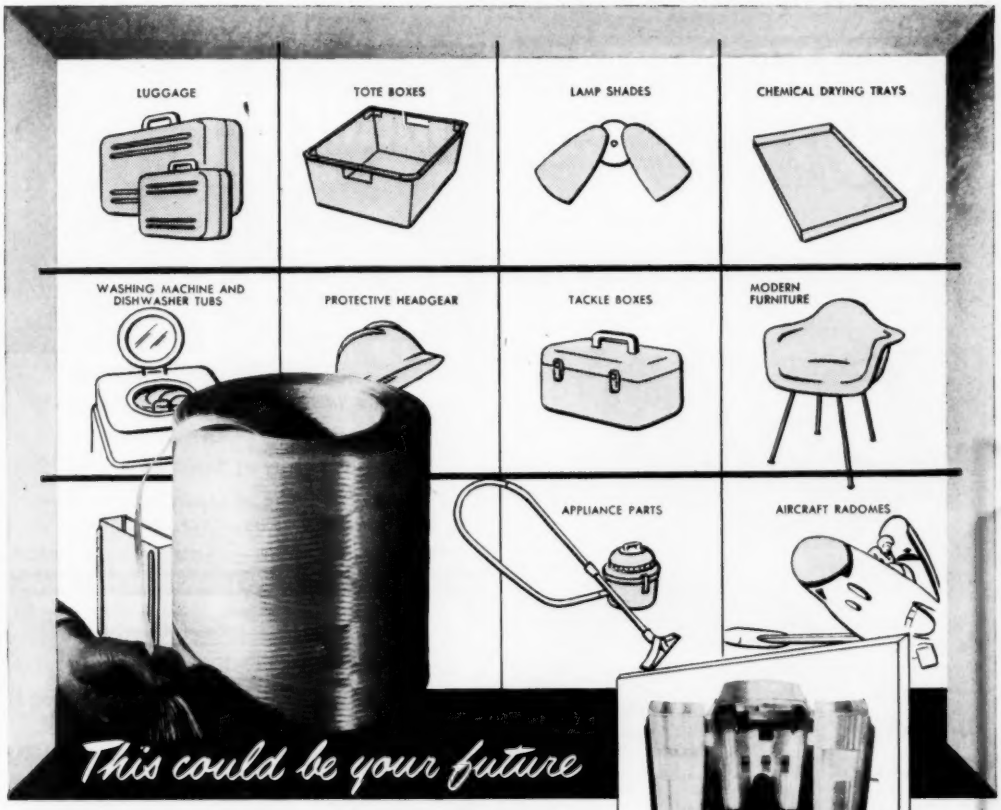

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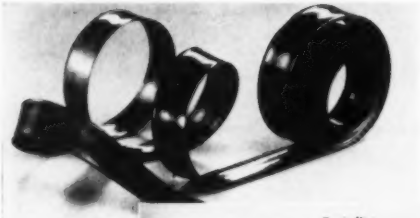

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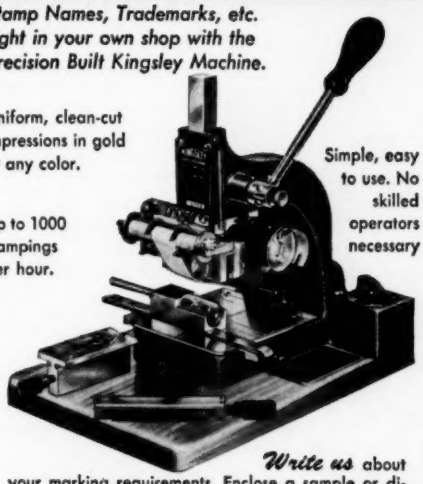

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Engineers

(*Continued from pp.* 137-46)

came quite a bit larger than the dimensional tolerance called for and, although the inserts were the correct size when they were placed in the mold, they were stretched oversize by the pressure of the transferred molding material. The Government agency receiving these hundreds of thousands of plastic parts did not check shipments as they arrived. As a result, it was several months and thousands of pieces later before this defect came to light. After a number of abortive attempts at salvage were made, the parts had to be destroyed. A sensible use of quality control in the case just described would have been the means of saving the company many thousands of dollars.

On New Molds

Another very important use of quality control is to aid the molder in judging the acceptability of a product from a new mold. Each new mold presents not only the problem of actual mold dimensions, but also the all-important problem of molding variables. These latter variables are dependent upon many things such as material variation, molding pressures, cycles, temperature variations, and the ever-present human factor.

It is all very good for a molder to feel that once he has taken a couple of shots from a new mold and checked these shots dimensionally, cavity by cavity, that he has properly investigated his new mold. This has been proved fallacious on many occasions. In addition to dimensional variations, there is always the factor of appearance. For example, a part may have only a very tiny chip, hardly perceptible to the eye; on the other hand, a sizable chunk may be broken from the part. Somewhere in between these two extremes lies a part acceptable to the customer. Here it is necessary to set up a standard below which the parts will be rejected; all parts equal to or above the standard will be satisfactory.

Here again, the majority of the members of the plastics industry feel that they do just this, because they tell their final inspection personnel: "Here is what you look for." However, the use of statistical quality control has been proved to be the best means for discovering the magnitude of these significant defects, and for greatly aiding in reducing the quantity of such defects to a minimum.

Every molder at one time or another has had an experience with a mold which was dimensionally accurate, yet for some unknown reason produced parts which were not accurate. There seemed to be no apparent reason for this phenomenon. One molder, now using statistical quality control, when faced with this dilemma was able to redesign his mold with an unorthodox set of dimensions; to the surprise of the diemaker, this unorthodox mold produced parts with satisfactory dimensions.

It is to be hoped that the plastics industry will reconsider its complacent attitude toward this new tool, and that they will at least investigate its possible use in their own plants.—END

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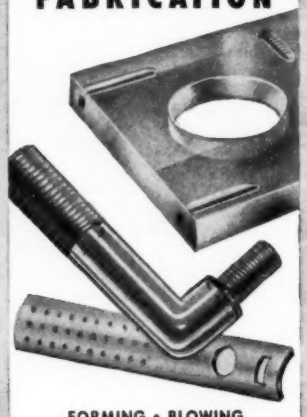

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Technology

(*Continued from pp. 149-50*)

minute and frequent attention, plastics offer possibilities. Products that last longer and serve better can be made. An example, outside the field of plastics, is the rubber tire. We have greatly extended the life of tires in the last decade, at the same time reducing the cost of tire mileage and service.

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Even where surfacing is required —where plastics applied to other materials give them some of the wear properties of plastics—the plastics have a fabulous future. In the paint and coatings industry, in just three years, we have seen the resins and their copolymers establish themselves as the biggest single factor in the field. Tomorrow's paints may all be plastic.

In synthetic textiles, the work done since the end of World War II has accomplished a revolution to the point where natural fibers are fighting for their very existence. The time may come when plastics fibers will be "sewn" electronically, when the cost of clothing will thus be lowered, and even chemists can have a dozen suits.

Plastics for Roads

The use of plastics resins as binders for woodwaste, foundry sand, and other low-cost materials in the making of economical products or the cutting of costs in industrial processes, has been accomplished but recently. With the terrific increase in the numbers of automobiles on the road, there has not been an attendant improvement in highways, nor an adequate expansion of our highway system. Let the civil engineers look to plastics, both for stability of road bed and durability of surfacing.

Take the same sort of materials, mix them with desert sand or useless clay, and with the use of little or no heat or pressure, you can make a building block which could be as cheap as adobe and could be made as durable as concrete. Take anything that's cheap and naturally wasted, try putting a little plastics in it, and you're likely to come up with a useful product.

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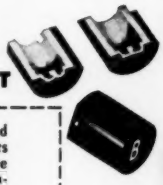

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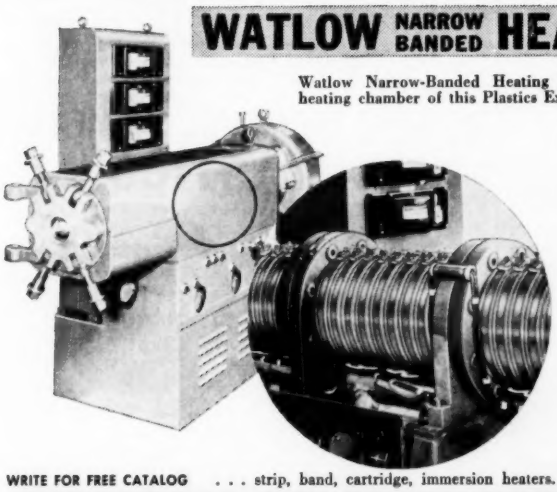

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kinds is still wide open. Even today, we could mold a plastic foam chair in one piece. It would be costly now, but it won't be tomorrow.

So what kind of plastics will we need in the future? I am of the opinion that in the area between the thermosetting materials and the thermoplastic materials, there is a whole field as yet unexplored, in which we will obtain materials with the advantages of both. As to what will be used in them, I can point to two outstanding possibilities: With lower cost fluorine and better methods of using it, we can, by the fluorination of more organic chemicals, make marvelously stable plastics—plastics that will be resistant to practically everything. By the new development of organo-silicon compounds, wherein the silicons replace the carbon in hydrocarbons, we will get still other plastics to fit our needs tomorrow.

Simpler Methods Needed

On the matter of methods, our basic methods of molding, calendering, laminating, and extruding have long been established. But I do want to point out that casting needs more attention. As we have been wasteful of raw materials and wasteful of man's muscles, we are still too wasteful of heat and pressure. And when we can use simpler means of producing the same end product properties, we should think in those terms—just as in chemical processing we should use more of the biochemist's arts.

We are not going to run out of the materials from which plastics are made. We will not be short of plastics. And we will not be short of needs for plastics. But we can be, and unless we take steps to prevent it, we are likely to be, short of technically trained men to develop our new plastics and our new uses for them—in other words, we are apt to run out of brains. We need more biochemists, more organic chemists, more engineers. And 10 or 20 years from now, we will have a still greater need for this type of man.

And out of every thousand young men who decide to make plastics chemistry and technology a career, we'll find one or two with imagination enough to think about tomorrow. There will be absolutely no limit to the usefulness of those men, nor to their rewards.—THE END.

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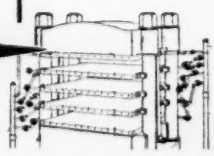

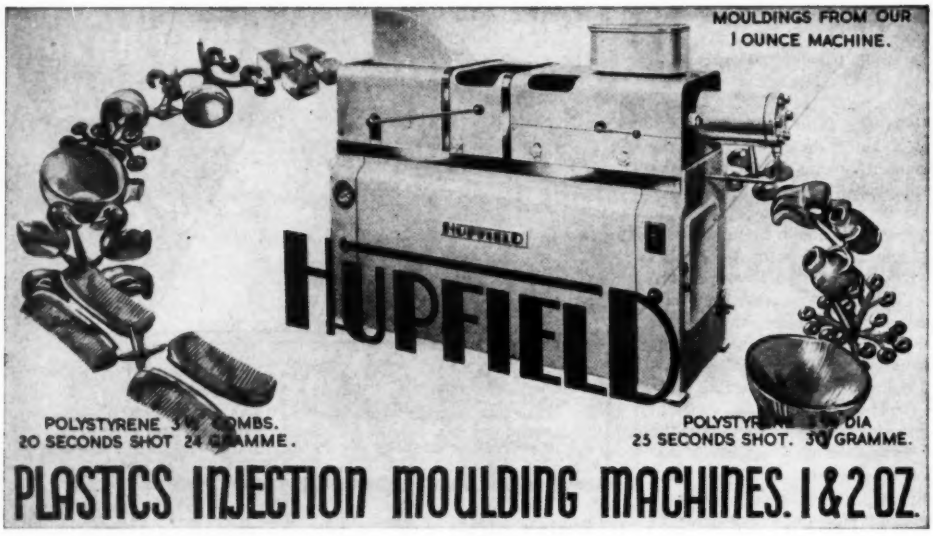

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Plasticizing Capacity per Hour	9 lbs.	18 lbs.
Injection Pressure	5½ tons	11 tons
Mould Locking Pressure	22 tons	44 tons
Mould Opening	4½"	7"

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Heating Unit Consumption	1000 Watts	2000 Watts
Motor, Electric	3 H.P.	6 H.P.
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Resins

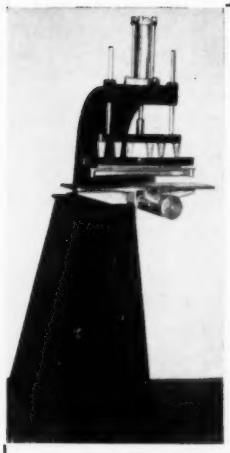
(*Continued from pp. 151-64*)

type of new product has recently been developed. When a urea-formaldehyde condensate is further reacted with a high alcohol such as dodecyl alcohol, as well as sodium bisulfite, the product contains both hydrophobic and hydrophilic groups. It is water-dispersible and can be used as a detergent (17). These products are claimed to be distinguished from ordinary detergents in that they exist as polymers instead of as micelles, and that their action is rather independent of conditions of application, e.g., concentration, temperature, and presence of salts. Although still in an experimental stage, they may have interesting possibilities. Evidently, by varying the polymer core (16), the hydrophobic groups, and the hydrophilic groups, a wide variety of materials of similar nature can be prepared.

The choice of a particular resin, among the many available, of course, depends on the specific applications involved. The following observations, however, may prove helpful: 1) Generally, melamine resins can be cured at a higher pH than urea resins. 2) Cured melamine resins are more resistant to the action of water and chemicals. 3) Melamine resins are more costly than urea resins. 4) The hydrophilic groups of an anionic resin permanently block the active methylol groups; the rate of cure of the resin is thereby affected; furthermore, as the hydrophilic groups are still present as such in the cured resin, the water-resistance of the resin is therefore somewhat lowered. 5) In cationic resins, if the cationic nitrogen has active hydrogen attached, it may further react with the methylol group of the resin during the curing process; a cured resin of this type is in general more water-resistant than the anionic type.

Acknowledgement

The authors are indebted to the Paper Chemicals Laboratory, the Textile Chemicals Laboratory, and the Leather Chemicals Laboratory of the Stamford Research Laboratories for supplying some valuable information. Comments and criticism of various members of these Laboratories, especially Messrs.



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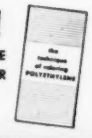

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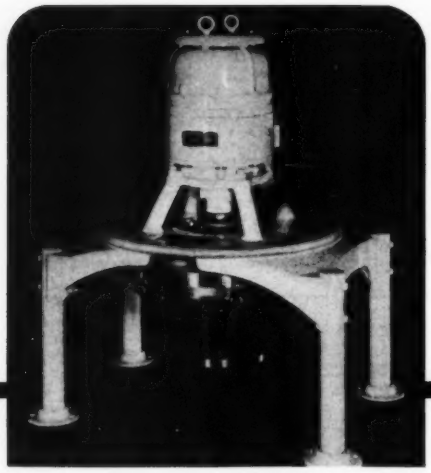
C. G. Landes, J. E. Lynn, C. S. Maxwell, A. S. Nyquist, and F. D. Thayer, Jr., have been very helpful. The authors also thank the Directors of these Laboratories for permission to publish this paper.

References

1. Aenishaenslin, R., Ciba Rev. No. 84, 3061-2 (1951).
2. Alexander, J. R., Burton, D., and Hausmann, F., U. S. Pat. 2,443,368 (1948).
3. Alexander, P., Carter, D., and Earland, C., J. Soc. Dyers Colourists *66*, 579-83 (1950).
4. American Cyanamid Co., Brit. Pat. 566,347 (1944).
5. American Cyanamid Co., Brit. Pat. 637,227 (1950).
6. American Cyanamid Co., unpublished results.
7. Auten, R. W., Paper Trade J. *127*, No. 5, 45-51 (1948).
8. Auten, R. W., U.S. Pat. 2,471,188 (1949).
9. Auten, R. W., and Morin, V. N., Canadian Pat. 448,750 (1948); Brit. Pat. 613,622 (1948).
10. Auten, R. W., and Rainey, J. L., U. S. Pat. 2,444,802 (1948).
11. Auten, R. W., and Rainey, J. L., U. S. Pat. 2,407,599 (1946).
12. Bakelite Corp., Brit. Pat. 639,884 (1950).
13. Baldwin, A. W., and Walker, E. E., Brit. Pat. 475,170 (1937); U. S. Pat. 2,146,392 (1939).
14. Beer, L., U. S. Pat. 2,347,024 (1944).
15. Bener, C., U. S. Pat. 2,161,223 (1939).
16. Bock, L. H., and Rainey, J. L., U. S. Pat. 2,454,541-5 (1948).
17. Bock, L. H., and Rainey, J. L., U. S. Pat. 2,486,459 (1949).
18. British Industrial Plastics, Ltd., Brit. Pat. 593,111 (1947).
19. Brookes, A., and Hudson, F. L., U. S. Pat. 2,556,898 (1951); Brit. Pat. 605,417 (1948).
20. Cameron, W. G., and Morton, T. H., J. Soc. Dyers Colourists *64*, 329-66 (1948).
21. Chapman, A. F., U. S. Pat. 2,533,557 (1950).
22. Charch, W. H., and Bateman, D. E., U. S. Pat. 2,159,009 (1939).
23. Ciba, Brit. Pat. 611,013 (1948).
24. Collins, T. T., and Adrian, A., "Wet Strength Paper," Boyce Publishing Co., New York (1949).
25. Conaway, R. F., U. S. Pat. 2,254,001 (1941).
26. Dawson, W. O., U. S. Pat. 2,316,740-1 (1943), 2,522,666 (1950); Brit. Pat. 639,616 (1950).
27. Dawson, W. O., U. S. Pat. 2,550,638-9 (1951); Brit. Pat. 628,818 (1949).
28. DeWaard, R. D., Hvizdak, A., and Stock, C. R., Am. Dyestuff Reptr. *37*, 513-8, 536-7 (1948).
29. Dixon, J. K., Christopher, G. L. M., and Salley, D. J., Paper Trade J. *127*, No. 20, 49-57 (1948).
30. Dixon, J. K., Woodberry, N. T., and Costa, G. W., J. Am. Chem. Soc. *69*, 599-603 (1947).
31. Dudley, J. R., Chem. Ind. *64*, 224-30, 320 (1949).
32. Dudley, J. R., and Anthes, J. A., U. S. Pat. 2,497,073-4 (1950).
33. Dudley, J. R., and Lynn, J. E., "Symposium on Fibrous Proteins," pp. 215-20, Soc. Dyers and Colourists, Leeds, England (1946).
34. Ellis, C., "Chemistry of Synthetic Resins," pp. 577-8, Reinhold Publishing Corp., New York (1935).
35. Evans, J. G., Brit. Pat. 501,288 (1939).
36. Felske, F. G., et al., Article in "Starch for Paper Coating," Tech. Association Pulp Paper Ind. Monograph Series No. 3, pp. 73-81 (1947).
37. Fineman, M. N., and Gruntfest, I. J., Tappi *33*, 357-60 (1950).
38. Fischer, R. M., Textile World *100*, No. 6, 129, 190, 192, 194 (1950).
39. Fluck, L. A., Keppler, G. J., Cooke, T. F., and Zimmerman, C. L., Am. Dyestuff Reptr. *40*, 154-63 (1951).
40. Fluck, L. A., Lynn, J. E., and McPhee, E. L., U. S. Pat. 2,539,366 (1951).
41. Gagliardi, D. D., and Nuessle, A. C., Am. Dyestuff Reptr. *39*, 13-9 (1950).
42. Gams, A., Widmer, G., and Fisch, W., Helv. chim. Acta *24*, 302-19E (1941); Brit. Plastics *14*, 508-20 (1943).
43. Gruntfest, I. J., and Gagliardi, D. D., Ind. Eng. Chem. *41*, 760-4 (1949).
44. Haigh, F. R., Ehrhardt, H., and Koerner, E. C., U. S. Pat. 2,516,055 (1950).
45. Hewett, P. S., U. S. Pat. 2,428,752 (1947); Brit. Pat. 641,697 (1950).
46. Hewett, P. S., Carter, R. E., Church, R. J., Paper Trade J. *124*, No. 24, 45-50 (1947).
47. Hodgins, T. S., and Hewitt, P. S., U. S. Pat. 2,358,276 (1944); Brit. Pat. 640,203 (1950).
48. Hodgins, T. S., and Hovey, A. G., Ind. Eng. Chem. *31*, 673-8 (1939).
49. Hodgins, T. S., and Hovey, A. G., U. S. Pat. 2,168,477 (1939), 2,185,167 (1939).
50. Johnstone, E. P., and Van Loo, W. J., U. S. Reissue Pat. 22,566 (1944).
51. Kadowaki, H., Bull. Chem. Soc. Japan *11*, 248-61 (1936).
52. Keim, G. I., Canadian Pat. 459,127-8



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● Secure Complete, Uniform Dispersion of Plastics Ingredients . . .

● Profit from Improved Color Blending

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and various free-flowing substances used in the chemical processing industries

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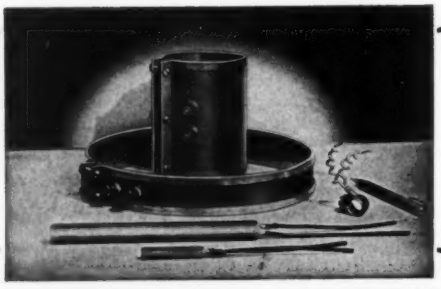

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(1949); U. S. Pat. 2,512,720 (1950).
53. Keim, G. I., Canadian Pat. 468,512 (1950).
54. Kuntzel, A., Colloquiumber. Inst. Gerbereichem. Tech. Hochschule Darmstadt, No. 2, 3, (1949); J. Am. Leather Chem. Assn. *45*, 252-5 (1950).
55. Kvalnes, H. M., and Chance, F. S., U. S. Pat. 2,452,200 (1948).
56. Landolt, A., J. Soc. Dyers Colourists *64*, 93-9 (1948).
57. Landes, C. G., Tappi *33*, 463-71 (1950).
58. Landes, C. G., U. S. Pat. 2,399,489 (1946); 2,524,915 (1950).
59. Landes, C. G., and Maxwell, C. S., Paper Trade J. *121*, No. 6, 37-46 (1945).
60. Lehr, J. C., O'Flynn, D. J., and Tompson, R. Y., U. S. Pat. 2,557,299 (1951).
61. Lewis, W. K., Squires, L., and Broughton, G., "Industrial Chemistry of Colloidal and Amorphous Materials," pp. 125-31, Macmillan Co., New York (1943).
62. Lindberg, J., and Gralen, N., Textile Research J. *18*, 287-301 (1948).
63. Lippert, A. L., U. S. Pat. 2,148,316 (1939).
64. Luther, M., U. S. Pat. 1,985,937 (1935); Brit. Pat. 320,915 (1929).
65. Mann, R. J., and Olpin, H. C., Brit. Pat. 628,022 (1949).
66. Maresh, C. and Royer, G. L., Textile Research J. *19*, 449-57 (1949).
67. Maxwell, C. S., U. S. Pat. 2,407,376 (1946).
68. Maxwell, C. S., and Landes, C. G., U. S. Pat. 2,559,220-1 (1951).
69. Maxwell, C. S., and Reynolds, W. F., Paper Trade J. *126*, No. 14, 45-9 (1948).
70. Maxwell, C. S., and Reynolds, W. F., Tappi *33*, 179-82 (1950).
71. Maxwell, C. S., Reynolds, W. F., and House, R. R., Tappi *34*, 235-8 (1951).
72. Maxwell, R. W., U. S. Pat. 2,373,135 (1945).
73. Meunier, V. C., and Cox, C. M., U. S. Pat. 2,517,128 (1950).
74. Morhrman, H. W., and Reese, R. E., U. S. Pat. 2,485,059 (1949); Brit. Pat. 601,983 (1948).
75. Monsanto Chemical Co., Brit. Pat. 611,244, (1948); 836,892 (1950).
76. Niedercorn, J. G., Shoe Leather Reptr. *231*, No. 3, 20-7 (1943).
77. Noerr, H., and Hees, W., Colloquiumsber. Inst. Gerbereichem. Tech. Hochschule Darmstadt, No. 2, 3, (1948); J. Am. Leather Chem. Assn. *44*, 418-9 (1949).
78. Novotny, E. E., et al., U. S. Pat. 2,512,672 (1950).
79. Nute, A. D., Am. Dyestuff Reptr. *34*, 167-70, 176, 230-1 (1945).
80. Pagani and Co., Ger. Pat. 654,714 (1937).
81. Piki, J., U. S. Pat. 2,505,649 (1950).
82. Pitzl, G., U. S. Pat. 2,451,867 (1948).
83. Pollard, J. D., U. S. Pat. 2,394,009 (1946).
84. Pollard, J. D., U. S. Pat. 2,417,014 (1947).
85. Porter, R. E., U. S. Pat. 1,975,616 (1934).
86. Rath, H., Georgi, H., and Dettinger, M., Melliand Textiber. *22*, 477-8 (1941); Chem. Abs. *37*, 2586 (1943).
87. Raynolds, R. J. W., Walker, E. E., and Woolvin, C. S., U. S. Pat. 2,243,682 (1941).
88. Rohm and Haas Co., Brit. Pat. 548,300 (1942).
89. Salley, D. J., and Blockman, A. F., Paper Trade J. *125*, No. 1, 35-40 (1947).
90. Schofield, G. and Harrison, H. A., World's Paper Trade Rev., Tech. Supplement, *128*, 57-62 (1947).
91. Schroy, P. C., U. S. Pat. 2,242,484 (1941).
92. Schuyten, et al., Textile Research J. *18*, 396-415, 490-503 (1948).
93. Schwank, M., Das Leder *1*, 177-80 (1950); J. Soc. Leather Trades Chem. *35*, 72-3 (1951).
94. Scott, M. J., U. S. Pat. 2,509,174 (1950).
95. Shapiro, L., Rayon Synthetic Textiles *30*, No. 7, 39-41; No. 8, 39-41; No. 9, 58-60 (1949).
96. Shaw, B. M., J. Soc. Chem. Ind. *66*, 147-9 (1947).
97. Smidth, L., U. S. Pat. 2,447,621 (1948).
98. Sorenson, B. E., U. S. Pat. 2,315,745 (1943).
99. Sorenson, B. E., U. S. Pat. 2,247,419 (1941).
100. Steenberg, B., Svensk Papperstidning *49*, 311-23 (1946).
101. Stock, C. R., and Salley, D. J., Textile Research J. *19*, 41-3 (1949).
102. Suen, T. J., U. S. Pat. 2,559,578 (1951).
103. Suen, T. J., and Daniel, J. H., Jr., U. S. Pat. 2,554,475 (1951).
104. Thurston, J. T., U. S. Pat. 2,357,273 (1944).
105. Tripp, F., Textile Bull. *73*, No. 6, 38, 41; No. 8, 41-2, 44 (1947).
106. West, H. J., U. S. Pat. 2,322,959 (1943).
107. West, H. J. and Watt, W. T., U. S. Pat. 2,529,856 (1950).
108. Widmer, G., et al., U. S. Pat. 2,169,546 (1939).
109. Widmer, G., and Fisch, W., U. S. Pat. 2,197,357 (1940).
110. Wiltshire, W. A., World's Paper Trade Rev., Tech. Supplement, *128*, 45, 49, 63 (1947).
111. Wohnsiedler, H. P., and Thomas, W. M., U. S. Pat. 2,345,543 (1944).
112. Wooding, W. M., U. S. Pat. 2,546,575 (1951).
113. Woodruff, J. A., ASTM Bull. No. 167, 83-5 (1950).
114. Woodward, R. N., U. S. Pat. 2,514,689 (1950).—END

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Amphenol is equipped with the knowledge and production facilities to provide the type of plastic process that meets your specific design requirements. Constant research and development have produced superior techniques in the forming of these hard-to-work plastics. Whatever your application need may be, Amphenol's engineering staff has the background and experience to cooperate with you in the solving of your problem.
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Jackson & Church announces

6 oz pre-plasticizing press

. . . Jackson & Church now enters the small machinery field with presses featuring the Hendry Pre-Plasticizing Process*.

This new, smaller J-C Pre-Plasticizing Press has all the advantages of larger pre-plasticizing presses utilizing the Hendry Process, and makes possible great savings in operation and valuable floor space.

One operator can operate a battery of five J-C 6 oz presses. Designed for semi or completely automatic operation on all thermoplastics, the J-C 6 oz pre-plasticizing press has a locking pressure of 180 tons and a potential projected area (depending upon part design, mold design and material) of 150 square inches. The press cycles completely with 6 oz of polystyrene in 9 seconds. The complete plug-in of all electric controls eliminates the necessity of disconnecting wires, and provides ease of maintenance.

specifications

MODEL—6 OZ AUTOMATIC

PLASTIC

Ounces per shot 6.5
Poundage per hour ..... 160 pounds (Styrene)
Available pressure per sq. in. on material in injection chamber ..... 15,000 p.s.i.

MECHANICAL

Stroke of clamp cylinder ..... 12" maximum
Speed of closing ..... 550 inches per minute
Slow down for clamping — adjustable
Speed of opening ..... 312 inches per minute
Slow down for knockout — adjustable
Max. overall height ..... 11 feet
Max. daylight opening ..... 20 inches
Min. daylight opening ..... 8 inches
Distance between tie rods .... Left to right 12½"
Front to rear 12½"
Floor space required .... 30 square feet

INJECTION

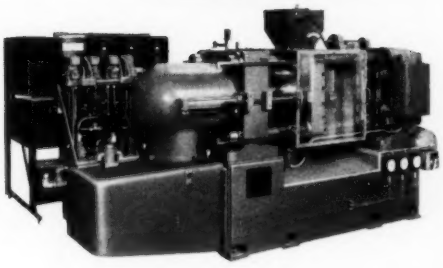
Speed of injection, maximum 233 inches per minute
minimum 20 inches per minute
Return speed ..... 277 inches per minute
Stroke of injection cylinder ..... 6 inches

ELECTRICAL

Total heater wattage ..... 6330 watts
Extruder motor ..... 10 HP
Hydraulic pump motor ..... 30 HP
Aux. hyd. pump motor ..... 1.5 HP
Machine supply voltage .... 220/440 v — 60 cycle

new 6 oz. machine!

16oz pre-plasticizing press*



...screw-type horizontal injection press featuring J-C's Hendry Pre-Plasticizing Process*

Utilizes such famous J-C design features as variable pitch screw, multi-stage extruder screw, single zone injection chamber holding 17 oz of constant temperature viscous material, and hydraulically operated injection ram. Plasticizes 180 pounds of styrene per hour with pressure exerted on the material in the injection chamber of 14,000 p.s.i. Locking pressure on the clamp is 250 tons.

Visit the Jackson & Church exhibit in booths 551-553 at the Fifth National Plastics Exposition in Philadelphia, March 11-14.

*patent applied for

Hendry PRE-PLASTICIZING PROCESS JACKSON & CHURCH CO Saginaw Michigan

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THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

Stable Impregnated Glass

DEVELOPMENT and distribution of stable resin impregnated glass fiber base materials for low pressure molding have been announced by Cordo Molding Products, Inc., 230 Park Ave., New York, N.Y., a recently formed organization. These impregnated materials are designated by the trade name Cordopreg, and are furnished as clear resin impregnations or with specified quantities of fillers and pigments. The stock can be made flame-resistant, and can be supplied either relatively dry or with tack.

All Cordopreg stock is supplied with the requisite amount of catalyst, ready to mold. These stabilized polyester materials will cure upon application of heat alone, although some pressure is recommended for appearance and development of properties. These pressures can vary from 12 to 14 p.s.i., as in vacuum bag molding, to the higher pressures used in compression molding.

Using these semi-processed materials incurs a higher cost for the molder than combining resin and fiber at the point of use, but this cost is offset by the following advantages of this method: 1) waste material is cut down since the cut-outs from patterns can be salvaged and reused in the same or other molded items; 2) surface finishes having excellent appearance can be consistently produced; 3) uniformity of impregnation and resin content assures product uniformity and maintenance of physical properties at a consistent level, and keeps scrap loss to a minimum by eliminating the problem of resin-starved and resin-rich areas; and 4) molding operations are clean and practically odorless.

Choice of Types—Four types of Cordopreg formulations are currently being offered to molders. The first group, stabilized polyester formulations which do not contain styrene or other volatile monomers, is designed to yield a variety of handling and molding properties. Modified diallyl phthalate formulations having improved flow characteristics comprise the second class, and the products molded from them exhibit higher interlaminar bond and better physical and chemical properties than straight diallyl phthalate resins. The third group, epoxy type formulations, are as easily handled when applied to cloth as the polyesters. The last category includes special formulations tailored to meet customer requirements.

In addition to Cordopreg stock, Cordo supplies resins formulated along the same lines as those used for impregnation.

Practically all types of woven glass cloth can be supplied to the molder with Cordopreg impregnation; this is normal procedure. However, where it is more advantageous, the customer may supply his own cloth for treatment. All processing is handled by Cordo Chemical Corp., Norwalk, Conn., producer of vinyl coated glass fabrics.

The new organization is headed by H. Clinch Tate, president. Technical service and sales are directed by Lawrence Wittman; Edward H. Homan is director of research and development.

Silicone Exhibit

AT a recent exhibit in New York, where a few of the many things that can be made from silicones were demonstrated, Dr. W. R. Collings, vice president and general manager of Dow Corning Corp., announced that his company will invest over $13 million under four certificates of necessity in a major expansion of plant capacity for silicone products. The fourth certificate for $10,194,000 has just been granted and provides for construction of chemical production facilities and for general plant services to make basic silicone fluids and resins. The combined project is the third and largest expansion by Dow Corning since the construction of its initial plant at Midland, Mich., in 1944.

The three other certificates approved during the past year as a part of this program involve the following investments: $560,000 for a plant to produce metallic silicon; $820,000 to build a methyl chloride plant; and $1,460,000 for a factory to produce Silastic—silicone rubber.

Delivery of steel for the new manufacturing facilities is expected next summer. Although about two years will be required to complete the new project, individual units will be put into operation as rapidly as they are completed.

Major applications for silicones shown at the exhibit indicate how they are used as a mold release agent in the rubber industry, as pan glaze for the baking industry, as resins and varnishes for a heat resistant class of electric insulation, as protective coatings, as water repellent finishes for textiles and masonry, as anti-foaming agents, and in Silastic rubber.

As a mold lubricant in the rubber industry, it is claimed that silicones eliminate 90% of rubber scrap and save 80% of the cost of cleaning molds.

Major silicone items in industrial projects are gaskets and "O" rings used in aircraft engines, automobile transmissions, and diesel-electric motors. Their value in such applications was shown by an exhibit in which a Silastic bellows was subjected to an oil bath at 350° F. without harm or damage to the plastic. This same heat stability makes silicone resins suitable for paints that protect metals at 1000° F. and that can be used in such commercial applications as spaceheaters or refrigeration units.

Resist Cold and Heat—Unlike many other materials which lose their effectiveness at low temperature if they are good at high temperature, silicone products resist cold as well as they resist heat. To illustrate this point, a continuous belt of Silastic was operated through a hot oil bath at 350° and through a cold bath at −80° F. Applications requiring such performance include seals for air-cooled ordnance and tank units.

Another interesting exhibit to show the stability of silicone fluids at both high and low temperature demonstrated their use as a damp-

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Smashing victories over Red MIG-15 jets have marked the performance of Amer
American Aviation F-86 Sabre jet fighters in combat service with the Air Force

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much to the split-second timing by pilots so vital in this type of aerial com

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ing medium for automobile, aircraft, and ordnance dashboard instruments —a few drops of silicone considerably reduce the effects of vibration.

The durability of a silicone water repellent treatment for textiles is so pronounced that the company believes silicone treatment for rainwear textiles such as gabardine, nylon, rayon, and so forth, will soon be well established. This same water repellency will keep above-grade concrete and masonry walls from wetting or changing color. Water repellency is further demonstrated in the buoyancy given to glass fibers used in Navy life jackets. A further use which is quite new is the treatment of leather for shoes, footballs, and other goods. When coated with silicone fluid the leather will remain soft, pliant, and water-proof, but the pores will remain open.

Molding Firm Purchased

PURCHASE of Molded Products Corp., one of the largest custom molders in this country, has been announced by Admiral Corp. The newly acquired company, which will be operated as a subsidiary, is the tenth manufacturing plant to be owned and operated by Admiral. Molded Products has a four-building plant containing 100,000 sq. ft. of floor space at 4533 W. Harrison St., Chicago, Ill., and produces about 150,000 television, radio, and phonograph cabinets a year.

Three Polyester Resins

THREE polyester resins that will withstand prolonged temperatures up to 500°F. without losing strength have been developed by American Cyanamid Co. They are being marketed as PDL 7-669, a general purpose resin; PDL 7-680, a fire resistant resin containing antimony trioxide; and PDL 7-679, a crystalline resin for impregnating mat or cloth.

The resins, based on triallyl cyanurate and reinforced by glass cloth, will give flexural strength values during exposure at 500°F. of from 30,000 to 35,000 p.s.i. Even after 24 hr. continual exposure at this temperature they retain their strength. Best previously available heat-resistant polyesters showed strengths of only up to 20,000 p.s.i. at this temperature.

Applications for these resins are expected in light weight, heat resistant airplane parts, in oven-wear for bakeries and the home, and in other uses where plastics materials currently available cannot be used.

Fluorocarbon Price Reduction

AS A result of expanded production facilities to meet steadily rising demands for Kel-F, The M. W. Kellogg Co., 225 Broadway, New York, N. Y., has announced a price reduction of this material of more than 10 percent. This is the third price cut since Kel-F was put on the market four years ago at $26 per lb., after it was declassified as a secret war material.

New prices for the low and high density molding powders in ton lots will now be $11 and $12 per lb., respectively. Prices for plasticized molding powder will be reduced on an average of $3 per lb. (as a result of lower plasticizer cost), which will mean that in ton lots it will now cost $13 per pound. Kel-F dispersions which can be applied as corrosion-resistant coatings, are still $15 per lb. of solid content.

Polyester Film

EXPERIMENTAL production of a new polyester film, called Mylar, has been announced by E. I. du Pont de Nemours & Co., Inc. It is tough, transparent, retains its flexibility at very low temperatures, and has high dimensional stability under heat and humidity changes.

Mylar is a condensation polymer obtained from ethylene glocol and terephthalic acid. It is chemically similar to Du Pont's new textile fiber Dacron. However, Dacron is spun whereas Mylar is cast in continuous sheets. It is also similar to Du Pont's recently announced polyester base for photographic film.

The film now sells for $3 to $4 per lb., depending on thickness. Reduction in price must await large scale production with its consequent reduction of costs.

Although it is expected to be several years before Mylar is generally available commercially, studies indicate its most promising applications will be in electrical insulation, in industrial tape, in laminations combined with other materials, and in packaging, collapsible tubes, and light weight storm windows.

It is the combination of properties which makes this film attractive and interesting for future development. For example, insulation for electric motors requires mechanical strength, long term resistance to heat, chemical inertness, and high dielectric strength. The producer claims that in Mylar film these qualities are "superior" to any other existing material except mica which is fragile, high priced, and in short supply.

The high strength of Mylar, which is said to be from two to eight times that of other commercial film, makes possible thin gages as fine as a quarter of one-thousandth of an inch, or about one-third as thick as the thinnest commercial films produced by Du Pont in the past.

Polystyrene Finish

EVEN wider uses of polystyrene in toys, novelties, and kitchen and office supplies are expected to result from the development of a new finish by United Lacquer Mfg. Corp., 1001 West Elizabeth Ave., Linden, N. J. Designated C 5138, the new material produces a uniform, smooth surface and is said to have excellent durability, adhesion to the polystyrene, and resistance to perspiration. It will not attack the plastic and cause cracks and wrinkles.

The finish, available in all standard colors, is applied to polystyrene by dipping or spraying.

Silicone Department Formed

FORMATION of the Silicone Products Dept. of General Electric Co.'s Chemical Div. has been announced by Robert L. Gibson, general manager of the division. These products were formerly manufactured by the Chemical Materials Dept., but the rapidly expanding silicone business suggested the advisability of forming a separate unit to handle production. In connection with silicone expansion, the company announced a $5 million program to increase capacity at the Waterford, N.Y., plant, where the new department has its headquarters.

The Silicone Products Dept., which

AS A *stabilizer* AND *internal lubricant* FOR POLYVINYL CHLORIDE TYPE PLASTICS USE BVS®

This modified barium ricinoleate developed especially as a stabilizer for polyvinyl chloride type plastics functions also as a preferred internal lubricant, markedly facilitating processing operations such as calendering and extrusion.

BVS is supplied as a fine white powder, very easily incorporated with the plastic base to give clear transparent films.

BVS has been found especially effective in stabilization of polyvinyl chloride type plastisols.

When used alone, 3 parts of BVS per 100 parts of resin are suggested as giving optimum stabilization. However, BVS is normally used in conjunction with other stabilizers to achieve synergistic stabilization, and, in these cases, the 3 parts of BVS PHR may be reduced but not below a level of 2 parts of BVS PHR.

SUGGESTED BVS STABILIZER COMBINATIONS which have proven effective

STABILIZER	PARTS PHR 1	2	3	4	5
BVS®	3.0	2.0	3.0	3.0	3.0
Vanstay L*	—	1.0	—	—	—
Plumb-O-Sil B**	—	—	1.0	—	—
Cadmium Ricinoleate	—	—	—	1.0	—
Victor 54***	—	—	—	—	1.0

1. Good heat and fair light stability (reference base).
2. Good heat and excellent light stability.
3. Good heat and fair light stability plus exudation resistance.
4. Excellent heat and good light stability.
5. Good heat and very good light stability.

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In those cases where lack of toxicity is of prime importance we suggest calcium ricinoleate as a substitute for BVS. It is only slightly less effective than BVS in stabilization and lubrication action and is regarded as free from toxic hazards.

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will be managed by Dr. Charles E. Reed, is the fourth product department in the Chemical Div., the others being Plastics, Chemical Materials, and Laminated and Insulating Products Departments.

Synthetic Wax Improved

IMPROVEMENT of color stability under heat of Acrawax C, a synthetic wax with a melting point of 285° F., has been announced by Glyco Products Co., Inc., 26 Court St., Brooklyn, N. Y. The product is a light tan, hard wax which is supplied in atomized, powdered, and coarse ground forms, as well as in solid cast form. It is used as an insulating wax, mold release agent, lubricant, water repellant, and anti-static agent.

SPE Officers Elected

AT a formal dinner held during the Eighth Annual Technical Conference of the Society of Plastics Engineers, Islyn Thomas, former national president and 1952 chairman of the board, introduced the following new officers of the society: William O. Bracken, Hercules Powder Co., president; Walter Oelman, Standard Molding Corp., vice president; John W. LaBelle, Koppers Co., Inc., secretary; and Don F. Hoffman, Evans-Winter-Hebb, Inc., treasurer.

Monomer Production

COMMERCIAL production of two new monomers—ethylene glycol dimethacrylate and diallyl maleate—for the production of new plastics and low pressure laminates has been announced by American Monomer Corp., Leominster, Mass. The manufacturer recommends their use for the following: polyesters, cross-linking agents in copolymerization, resins, rubber chemicals, coatings, drying oils, and pharmaceuticals.

Subsidiary Companies Formed

ANNOUNCEMENT has been made by The Dow Chemical Co. of the formation of two new wholly-owned subsidiaries—Dow Chemical Inter-American Ltd. and Dow Chemical International Ltd.—which will extend the firm's international activities from their headquarters at Midland, Mich. The former will handle company business in Mexico, Central and South America, and the West Indies; the latter will function for Dow in Europe, Asia, Africa, and Australia.

The same officers head the two companies: Clayton S. Shoemaker, president; Howard R. Ball, sales manager; and William R. Clulo, treasurer and assistant secretary.

Enters Low Pressure Molding Field

CUSTOM molded polyester products, reinforced with glass fiber, are now being manufactured by the Plastics Div., Fabricon Products, Inc., 1721 Pleasant Ave., River Rouge, Mich., in addition to the company's established line of resin impregnated papers and fabrics for laminating and molding. These new products are available in sizes up to 32 by 48 by 12 in. or 32 by 44 by 23 inches. Preforming equipment is also available to produce irregular shaped parts.

Label Machine

EQUIPMENT for cutting and printing vinyl labels has been developed by Mayflower Electronic Devices, Inc., 6014 Hudson Blvd., West New York, N.J. Rolls of vinyl material are run through a machine which prints the labels, and then tear-seals them from the roll. The company also has a method of producing two- or three-color labels which can be adhered by a label machine to sweaters, neckties, and other apparel.

Vinyl Dispersion Products

FIVE years of research in the field of vinyl dispersions by Watson-Standard Co., 225 Galveston Ave., Pittsburgh, Pa., has resulted in the development of a series of related products—organosols, plastisols, foamosols, rigidsols, and plastigels. These products are expected to find useful application in various types of molding, and the manufacturer claims that with a minimum investment they will make possible the production of finished items that exhibit excellent chemical resistance, durability, and flexibility, and in many cases will overcome the problems of solvent resistance and color that are inherent difficulties in the use of rubber.

End products suggested by the manufacturer for organosols are film casting; for plastisols, slush molding, toys, and the like. Foamosol, which is foamed vinyl plastisol, is recommended for molding or film casting. This particular dispersion is unique in that no pressure is required in the foaming of sheet up to $\frac{3}{4}$ in. in thickness. Typical uses are for back-up for textiles, dress shields, and shoulder pads for women's garments, and as a lining for molded plastisol doll parts to give them better "feel." Foamosol adheres to fabric, and can be spray-coated onto wooden and metal chair seats. It can also be molded into such items as gaskets.

Rigidsol, for molding or casting, combines properties of toughness and apparent rigidity with pliability. Suggested uses are for such industrial applications as gaskets, tubing, hose, and flexible bottles.

Plastigel is a product that may be pre-formed or pre-shaped and then cured (conventional vinyl dispersions must be cured in the mold). It is used for casting or extrusion operations, and may also be molded or sculptured and cured in a common kitchen oven.

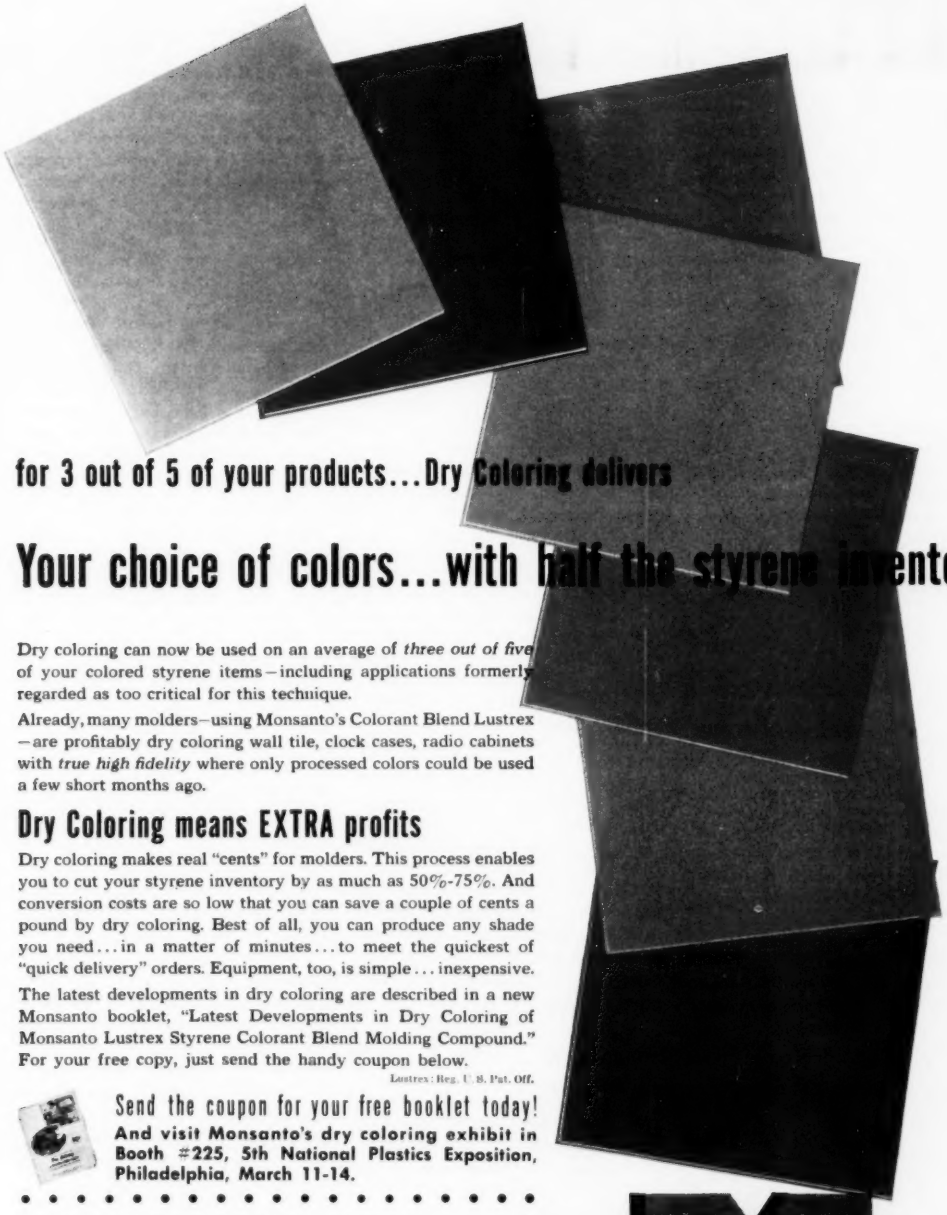
All five dispersions are available in a wide range of colors with extreme chemical resistance for the end use product.

EXPANSIONS

United Lacquer Mfg. Co., Linden, N.J., plans to triple its research facilities. "An important objective of the expanded research facility," says a company spokesman, "will be to originate new materials for government agencies, particularly for defense projects." Special development projects will be instituted on behalf of the textile printing, laminating, and plastics industries.

Yardley Plastics Co., 142 Parsons Ave., Columbus, Ohio, announces the completion of a $180,000 plastics processing plant. The new facility, where polyethylene, butyrate, and styrene products will be manufactured, is expected to increase output of plastic pipe and fittings by 40 percent.

National Starch Products, Inc., 270 Madison Ave., New York, N. Y.,



for 3 out of 5 of your products...Dry Coloring delivers

Your choice of colors...with half the styrene inventory

Dry coloring can now be used on an average of *three out of five* of your colored styrene items—including applications formerly regarded as too critical for this technique.

Already, many molders—using Monsanto's Colorant Blend Lustrex—are profitably dry coloring wall tile, clock cases, radio cabinets with *true high fidelity* where only processed colors could be used a few short months ago.

Dry Coloring means EXTRA profits

Dry coloring makes real "cents" for molders. This process enables you to cut your styrene inventory by as much as 50%-75%. And conversion costs are so low that you can save a couple of cents a pound by dry coloring. Best of all, you can produce any shade you need... in a matter of minutes... to meet the quickest of "quick delivery" orders. Equipment, too, is simple... inexpensive.

The latest developments in dry coloring are described in a new Monsanto booklet, "Latest Developments in Dry Coloring of Monsanto Lustrex Styrene Colorant Blend Molding Compound." For your free copy, just send the handy coupon below.

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Send the coupon for your free booklet today!

And visit Monsanto's dry coloring exhibit in Booth #225, 5th National Plastics Exposition, Philadelphia, March 11-14.

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has launched a $2 million program to expand its resin production. First step in the three-year program will double the company's capacity for producing vinyl acetate polymers and copolymers. Until recently, National has polymerized vinyl acetate for its own use; this increased capacity enables the firm to make available to other users a much larger supply of this material.

Canadian Industries Ltd. is planning to start building a $13 million plant this spring at Edmonton, Alberta, for the manufacture of polyethylene. This is the first such plant in Canada and initial production, expected to begin late in 1953, will be about 6000 tons of polyethylene flake a year, a figure representing more than eight times the amount presently available in Canada by import from the United Kingdom and the United States. The polyethylene unit is the second major chemical project recently announced by C-I-L: the first was a nylon raw materials plant at Maitland, Ont. Both projects will make Canada self-sufficient in these two materials which were previously imported.

Heyden Chemical Corp. has started production of resorcinol at an annual rate of 600,000 lb. at its Garfield, N. J., plant which has been rebuilt with doubled capacity since it was partially destroyed by fire last year. According to John P. Remensnyder, president of the company, "the enlarged resorcinol plant is the first step in an expansion program to increase resorcinol facilities to 1 million lb. annually."

Canadian Resins and Chemicals Ltd. is constructing a $2.5 million plant at Shawinigan Falls, Que., to produce types of vinyl resins which are now imported, such as vinyl chloride dispersion resins. Construction will begin this spring and is expected to be finished in 1953. The company also has under construction at present a $1 million calender line.

J. M. Huber Corp. has announced construction of a plant to produce chemicals and pigments at Havre de Grace, Md. Production is expected to start by May, 1952, and one of the first products will be Zeolex 20, a reinforcing white pigment for plastics and rubber products. The material is defined as a silico aluminate that has been in pilot plant development for several years. John R. Lill, manager of the Chemicals Div., will supervise the new unit.

American Molding Powder & Chemical Corp., 703 Bedford Ave., Brooklyn, N. Y., has announced the addition of virgin polyvinyl chloride to its Ampacet line of thermoplastic compounds. It is made to users' specifications to include properties from rigid to soft, including resistance to low or high temperatures, water, salt, oils, greases, alkalies, and most strong acids.

Thermacote Co. has announced increased production facilities at its new plant at 301 Mount Pleasant Ave., Newark, N. J. The firm, which is engaged in plastic fabricating and polyester glass fiber reinforced plastic molding, expects to introduce new products this year for the ice cream and welding industries.

Benchmaster Mfg. Co. has announced plans for the construction of a $750,000 plant for the manufacture of punch presses, milling machines, and accessories. Located at Gardena, Calif., the first unit of the new facilities will have 20,000 sq. ft. of floor space. The company also announced that Milton K. Grey was named general and sales manager.

Hercules Powder Co. has planned an $8 million plant, scheduled for 1953 completion, for the manufacture of phenol, para-cresol, and acetone by a newly developed process. Phenols will be produced from aromatic hydrocarbons, and cresols from terpene hydrocarbons by an oxidation process which involves the production of organic hydroperoxides as the basic intermediate step in the method.

Unlike existing processes for manufacture of phenol, the new Hercules method does not consume sulfur or chlorine, basic raw materials that are now in short supply. Simplicity of the new process is also such that other phenols and phenolic materials may be produced at will with minor equipment modifications.

The new plant, to be located in the Delaware River industrial section, will acquire propylene and benzene from petroleum refineries or coke ovens in the area. Terpenes, the raw materials for para-cymene process, will come from the Hercules naval stores operations in Georgia and Mississippi.

Auburn Button Works, Inc., Auburn, N.Y., has announced completion of a new experimental laboratory for its recently expanded extrusion unit. The facilities were set up to handle quality control of raw materials and finished products, development of new vinyl compounds, and research for more efficient production methods. It will also serve as a pilot plant.

Pittsburgh Plate Glass Co. has planned to purchase a three-year old factory at Shelbyville, Ind., as a manufacturing unit for its new Fiber Glass Div. Production of two types of fiber glass—strand fiber and super-fine fiber—is expected to commence within six months.

Koppers Co., Inc., has announced that the sixth plant in its Chemical Div. will go into operation during 1952 at Port Arthur, Texas, for producing ethylbenzene. The five other plants in the division are undergoing expansion to produce, in some cases, 50% greater volume.

The company has projected completion of 17 chemical-recovery coke batteries, comprising 912 ovens, for the steel industry. Of the 912 ovens, 698 will be new, the rest, replacements.

Research program of Koppers will be centered at Verona, Pa., where new laboratories are nearing completion. By 1953 the company expects to have nearly 200 technicians at work there.

Carbide and Carbon Chemicals Co. has announced construction of a major unit for the production of polyethylene resins as an addition to its Texas City plant. Actual new construction includes three new buildings on an 8-acre plot. A Certificate of Necessity has been granted for this project, which is expected to be in production early in 1953. Estimated annual production of the unit is 50 million pounds. It has been

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estimated, furthermore, that the total U.S. annual production of polyethylene, from Carbide's Texas City and South Charleston plants and from other producers, will be between 100 and 150 million lb. by the end of 1952. It is anticipated that the entire production of the Texas City unit will go into the defense effort. It is also expected that, by the end of 1952, the military requirements for applications of extreme urgency will still be in excess of the country's ability to produce polyethylene. These requirements will continue to increase during 1953 if the rearmament program continues at its present rate.

Pittsburgh Coke & Chemical Co. has announced that new plant facilities, which will substantially increase the company's plasticizer production, will be completed before June at their Neville Island, Pa., plant. When these new facilities are completed, it will be possible for the company to pipe molten phthalic, a basic ingredient in many of their plasticizers, directly to the new processing building from the firm's adjacent phthalic anhydride plant. The ability to pipe molten phthalic will speed up production, prevent contamination, and thus allow the company to control the quality and purity in order to provide an odorless water-white plasticizer. Most manufacturers of phthalate plasticizers generally use flake or ship molten phthalic in tank cars.

COMPANY NOTES

Heyden Chemical Corp., 393 Seventh Ave., New York, N. Y., has announced the addition of **James P. Scullin** and **Joseph A. Trivisone** to the **Market Development Dept.**

Celanese Corp. of America, 180 Madison Ave., New York, N. Y., has elected three new vice presidents—**John D. Fennebresque**, in charge of the chemical division; **G. W. Seymour**, technical control; and **Kenneth G. Donald**, foreign operations.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has acquired the common stock of **Consolidated Machine Tool Corp.**, Rochester, N. Y., and will operate Consolidated's Rochester plant as a subsidiary company which will continue to produce machine tool lines. **Arthur H. Ingle** remains president of Consolidated.

Conforming Matrix Corp., Factories Bldg., Toledo, Ohio, has appointed **Elmer L. Faber** as plant superintendent and head of the engineering department and **Milton T. Schimmel** as manager of engineering sales.

National Rubber Machinery Co., 47 W. Exchange St., Akron, Ohio, has been named midwest distributor for the Randall Duster, produced by **Randall Duster Corp.** for dry spraying powders in rubber and plastics plants.

The Baker Castor Oil Co., 120 Broadway, New York, N. Y., has elected **J. A. Johansen** and **Daniel R. Finn** to the board of directors. **James F. O'Brien** has been named sales representative for New York State.

Flexoid Laboratories and **DiFlex Co.** have moved their offices and factory to 136 E. Ten Mile Rd., Hazel Park, Mich.

Plastic Manufacturers, Inc., 280 Fairfield Ave., Stamford, Conn., has changed its corporate name to **PM Industries, Inc.** Personnel remains the same.

Lincoln Plastics Corp. has moved its New York offices to 580 Fifth Ave.

Steiner Plastics Mfg. Co., Inc., has added 10,000 sq. ft. of space to its existing 75,000 sq. ft. plant at Pratt Oval, Glen Cove, N. Y.

Classic Plastics, Inc., 149 Denton Ave., New Hyde Park, N. Y., has been organized for vinyl molding by **S. H. Halpern, R. B. Johnson** and **H. A. Dubin.**

Imperial Chemical Industries Ltd. of London has appointed **Dr. J. S. Gourlay** a managing director of the **Plastics Div.** and **S. P. Thompson** as secretary of the same division.

Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill., has appointed **Power Transmission Products Div., Portland Iron Works**, 1107 N.W. 14th Ave., Portland, Ore., as distributor for its pneumatic and hydraulic cylinders and valves in the far west.

U. S. Plywood Corp. has opened a new sales and distribution office at 5914 "R" St., Sacramento, Calif. **William A. Haskin** is manager.

The Dow Chemical Co., Midland, Mich., has named **Frank J. MacRae** as assistant manager of plastics technical service and **Miles J. Kalahar** has joined the extrusion section.

Industrial Plastic & Textile Co., 72 Woolsey St., Irvington, N. J., is offering reprocessed polyethylene in pellet form in clear, brown, and black and can handle custom reprocessing of polyethylene, vinyl, and other plastics materials.

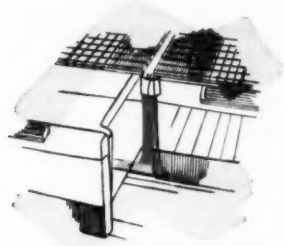
Synthane Corp. has opened an Indianapolis sales office headed by **Duane W. Roland. C. Leonard Johnson** has been named manager of the Rochester sales office.

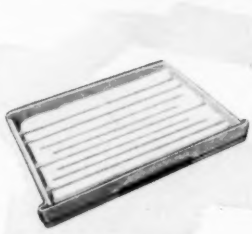
Taylor Fibre Co., Norristown, Pa., manufacturer of laminated plastics, has elected the following people to the board of directors—**Frederick S. Carpenter, Melvin L. Carl,** and **Oliver Wellington.** The company has opened a new district office at 822 Wood St., Pittsburgh, Pa.

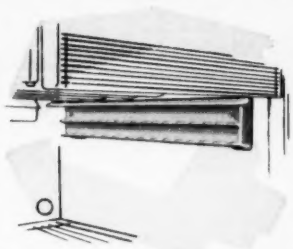
Naugatuck Chemical Div., U. S. Rubber Co., has appointed **Clayton F. Ruebensaal** to the newly-created post of commercial development manager. **Dr. D. Lorin Schoene,** formerly manager of organic research, succeeds him as manager of plastics development.

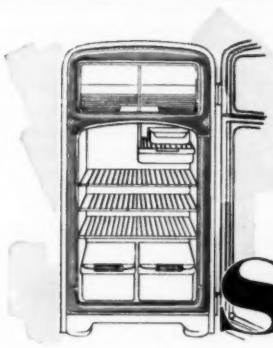
Corrulux Corp., 410 Holmes Rd., Houston, Texas, has announced the opening of five divisional sales offices: Northeastern Div., Wilmington, Del., headed by **G. D. Jefferson;** Southeastern Div., Atlanta, Ga., under **Carl Olson;** Corrulux Midwest, Inc., Des Plaines, Ill., headed by **L. V. Warner;** West Coast Div., Pasadena, Calif., managed by **George Paradise;** and Southwestern Div., headed by **P. W. Fisher** at the home office in Houston, Texas.

Libbey-Owens-Ford Glass Co., has named **J. M. Johns**, general manager of industrial sales, as general manager of the new **Fiber-Glass Div.** with headquarters in the Nicholas









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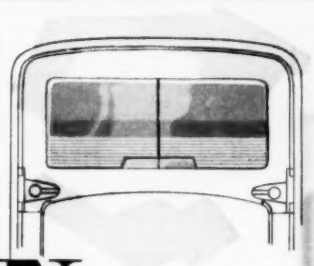

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Styron brand plastics, remember, are available in a wide range of *quality-controlled* colors and formulations, of which Styron 475 is one. Dow's Plastics Technical Service is equipped to help you determine the applicability of Styron to your manufacturing operation.

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Bldg., Toledo, Ohio. The division has established an East Coast sales office at 570 Lexington Ave., New York, N. Y., headed by **Arnold K. McClay**.

Monsanto Chemical Co., Plastics Div., has appointed **Harold D. Woodmansee** branch manager of the Detroit sales office and **Ronald H. Burnett** purchasing agent. **Edmund Greene** has been named sales promotion manager for the **Organic Chemicals Div.** and **Walter Campbell** succeeds him as advertising manager of the **Merrimac Div.**, Everett, Mass.

Glass Fibers, Inc., 1810 Madison Ave., Toledo, Ohio, has appointed vice presidents **Jesse H. Plummer** and **Raymond F. Mensing** as general factories manager and general business manager, respectively. **Frank McLeod** has been named sales manager of the **Textile Div.**

General Electric Co. has announced the following appointments in its **Chemical Div.: John L. McMurphy** has been named general manager of the **Plastics Dept.; Sam L. Brous** succeeds him as general manager of the **Chemical Materials Dept.; James W. Raynolds** takes Mr. Brous' place as marketing manager of the division; and **Dr. Alphonse Pechukas** has been named engineering manager; **William S. Smith** has been appointed advertising manager; and **Royce W. Hill** has been named production supervisor at the Pittsfield, Mass., phenolic products plant.

Hercules Powder Co., announces the following personnel appointments in the **Synthetics Dept.: Henry A. Thouron** is assistant general manager, **James W. L. Monkman** succeeds him as director of sales, and **Paul L. Johnstone** is director of development; **David S. Bruce** has been named manager of new product production for the **Cellulose Products Dept.;** in the **Paper Makers Chemical Dept.** at Holyoke, Mass., **C. H. Kent** has been named special sales representative in New York and New England and **Henry L. Mellen** is district manager; in the **Research Dept. Dr. Peter Van Wyck** has been promoted to associate technical director, **Dr. Howard G. Tennent** replaces him as manager of the **Experiment Station,** and **Dr. P. Burke Welldon** succeeds Dr. Tennent as manager of the **Cellulose Products Research Div.**

Shawray Plastics Corp., 398 Broadway, New York, N. Y., has been appointed converter and distributor of **Goodyear Tire & Rubber Co.'s** Goodyear Vinylfilm. The recently reorganized firm is headed by **Edward Shaw,** president, and **Arthur Blumenthal,** vice president, the latter having resigned as vice president of Plastron, Inc.

Metaplast Process, Inc., high vacuum metalizer of plastics, has announced the removal of its plant to 34-51 56th St., Woodside, N.Y.

The A B A Tool & Die Co., Inc., has opened its new plant with expanded facilities at 1395 Tolland Turnpike, Manchester, Conn.

B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, Ohio, announces the election of **James C. Richards, Jr.,** as vice president of sales and the appointment of **Allyn I. Brandt** as general merchandising manager. Mr. Richards, who joined the company in 1934 and had been manager of international sales the past two years, succeeds John Hoover who was elected president recently. Mr. Brandt, former general sales manager, has been associated with the firm since 1930.

PERSONAL

C. J. O'Neil has been appointed by **Johns-Manville Corp.** to the newly created post of merchandise manager for the **Celite Div.,** 12 E. 40th St., New York, N. Y., which produces diatomaceous silica, used as a filler for reinforced plastics.

Dr. Fred R. Conklin has been named works manager of **Tennessee Eastman Co.,** Kingsport, Tenn., succeeding Herbert G. Stone who continues as vice president. Dr. Conklin joined the firm in 1931 to do development work in plastics.

Gen. E. R. Quesada has been elected vice president and director of **Olin Industries, Inc.,** East Alton, Ill., where he will be directly concerned with the company's contemplated expansion program in cellulosics and minerals.

The company has appointed **F. S. Elfred** an executive vice president, **B. E. Bassett** a vice president for production, and **M. W. Acker** a vice president.

John J. Hickerson has been appointed a research chemical engineer for **Armour Research Foundation of Illinois Institute of Technology,** Chicago, Ill.

Dr. E. W. Volkmann has been named associate director, **Research Dept., Koppers Co., Inc.,** Koppers Bldg., Pittsburgh, Pa. He was formerly assistant technical director of the Tar and Chemical Division.

Dr. Vlon N. Morris has been appointed director of research for **Shellmar Products Corp.,** Mt. Vernon, Ohio. Dr. Morris was formerly associated with Industrial Tape Corp.

Paul Theodore has joined the sales and product development department of **Olympic Plastics Co.,** 215 E. Washington Blvd., Los Angeles, Calif., where he will handle the promotion of proprietary items.

Hall Kaighin has been named to head the **Product Engineering Dept., Lippincott & Margulies, Inc.,** 500 Fifth Ave., New York, N. Y. industrial designers.

Dr. Richard N. Work, formerly with the Rubber Section of the National Bureau of Standards, has been appointed a research associate in Plastics at **Princeton University.** He will conduct research work in high polymers.

Alfred W. Wandschneider has been appointed to **Durez Plastics & Chemicals, Inc.'s** Chicago office at 221 N. La Salle St., as a sales engineer in the **Phenolic Molding Compound Div.**

Walter H. Meyer has been named to head the new Detroit office of **Bee Chemical Co.** He will supervise sales in Michigan, Ohio, and western Pennsylvania.

Richard Piez, formerly with Dewey & Almy Chemical Co., is now representing **New England Lacquer Co.** and **Chemical Products Corp.** on

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the West Coast. The former firm manufactures specialty cable coatings for insulated wire and polystyrene finishes; the latter company produces vinyl plastisols. Mr. Piez' headquarters are at 151 D West Hillsdale Blvd., San Mateo, Calif.

William B. Sander has been named vice president and general manager of **Extruders, Inc.**, 3232 El Segundo Blvd., Hawthorne, Calif.

Robert A. Weisse has been appointed assistant sales manager for **The Kaydon Engineering Corp.**, McCracken St., Muskegon, Mich.

Marshall M. Smith, former director of the machinery division of NPA, has been appointed managing director in the Paris office of **Emhart Mfg. Co.** He will handle European and North African business for the firm's operating units, which include Plax Corp.

Dr. Wesley D. Schroeder has been appointed supervisor of plasticizer research by **Pittsburgh Coke & Chemical Co.**, Grant Bldg., Pittsburgh, Pa.

John David Beinert has opened an industrial design office at 6 East 53 St., New York, N. Y.

R. Ruffin Cook, formerly with Monsanto Chemical Co., has been appointed technical assistant to the manager, **Resin Sales Section, The Barrett Div., Allied Chemical & Dye Corp.**, 40 Rector St., New York, N. Y.

T. F. Fleming has been named general manager of the **Morrison Engineering Corp.**, 2222 Fairhill Rd., Cleveland, Ohio, manufacturer of heat treating equipment.

Charles Muehlstein, director and vice president of **H. Muehlstein & Co., Inc.**, 60 E. 42 St., New York, N. Y., has announced his retirement after more than 45 years with the firm. **Alfred Stein** succeeds him as director of the Chicago office.

William L. Schwalb has joined the sales staff of **John H. Calo Co., Inc.**, 19 Rector St., New York, N. Y.

Dr. Donald B. Keyes, a special consultant to and director of **Heyden Chemical Corp.**, was elected a Fellow of the New York Academy of Sciences for his outstanding scientific work.

Nicholas J. Jammal, formerly with Vulcanized Rubber & Plastic Co., has been elected president and general manager of **Hershberg Products Co.**, Ashtabula, Ohio.

Walter J. A. Connor, formerly with Koppers Co., Inc., and Celanese Corp., has been appointed general sales manager by **Celluplastic Corp.**, 34-50 Ave. L, Newark, N.J.

Kenneth C. Towe has been elected president of **American Cyanamid Co.**, succeeding the late Raymond C. Gaugler. Mr. Towe joined the firm in 1926 and has been a director of the company since 1939. He was vice president in charge of finance until his recent election.

Fred J. Stickle has been named eastern regional sales manager of the **Coating Resins Dept.** of **American Cyanamid Co.**, 30 Rockefeller Plaza, New York, N. Y.

William Aiken has resigned from his position as assistant to the chief, Chemical Div., Goodyear Tire & Rubber Co., Inc., to accept a post as technical director of the **Gardner Board & Carton Co.**, Middletown, Ohio.

W. F. Twombly, a vice president of **Witco Chemical Co.**, 295 Madison Ave., New York, N. Y. was recently elected to the board of directors.

Whiting N. Shepard, formerly of Plaskon, has joined the **Boston Woven Hose and Rubber Co.**, Cambridge, Mass.

R. Wolcott Hooker, vice president in charge of sales, **Hooker Electrochemical Co.**, was elected president of the **Compressed Gas Association, Inc.**, and reelected president of **The Chlorine Institute, Inc.**

John C. Macksey has been appointed by the **Firestone Plastics Co.** as Eastern sales representative for Velon flex. His headquarters are in the Empire State Bldg., New York, N. Y.

Dr. George O. Curme, Jr., has been elected a director of **Union Carbide and Carbon Corp.** to succeed the late James A. Rafferty. Dr. Curme, as vice president, is in charge of all research activities.

Deceased

Raymond C. Gaugler, president of **American Cyanamid Co.**, died suddenly January 10. He was 59 years old. Mr. Gaugler joined the company in 1917, became a director in 1929, and was elected president in 1951, succeeding the late W. B. Bell.

Edward Walter, founder and president of **Hartland Plastics, Inc.**, Hartland, Wis., died December 28.

MEETINGS

Mar. 3-7—American Society for Testing Materials, Spring Meeting and Committee Week, Hotel Statler, Cleveland, Ohio.

Mar. 11-14—Society of the Plastics Industry, Fifth National Plastics Exposition, Convention Hall, Philadelphia, Pa.

Mar. 16-19—American Institute of Chemical Engineers, Atlanta Biltmore Hotel, Atlanta, Ga.

Mar. 22-Apr. 6—Chicago International Trade Fair, Navy Pier, Chicago, Ill.

Mar. 30-31—Packaging Machinery Manufacturers Institute, Semi-Annual Meeting, Hotel Dennis, Atlantic City, N. J.

Apr. 1-4—National Packaging Exposition, 21st Annual Conference, Atlantic City Auditorium, Atlantic City, N. J.

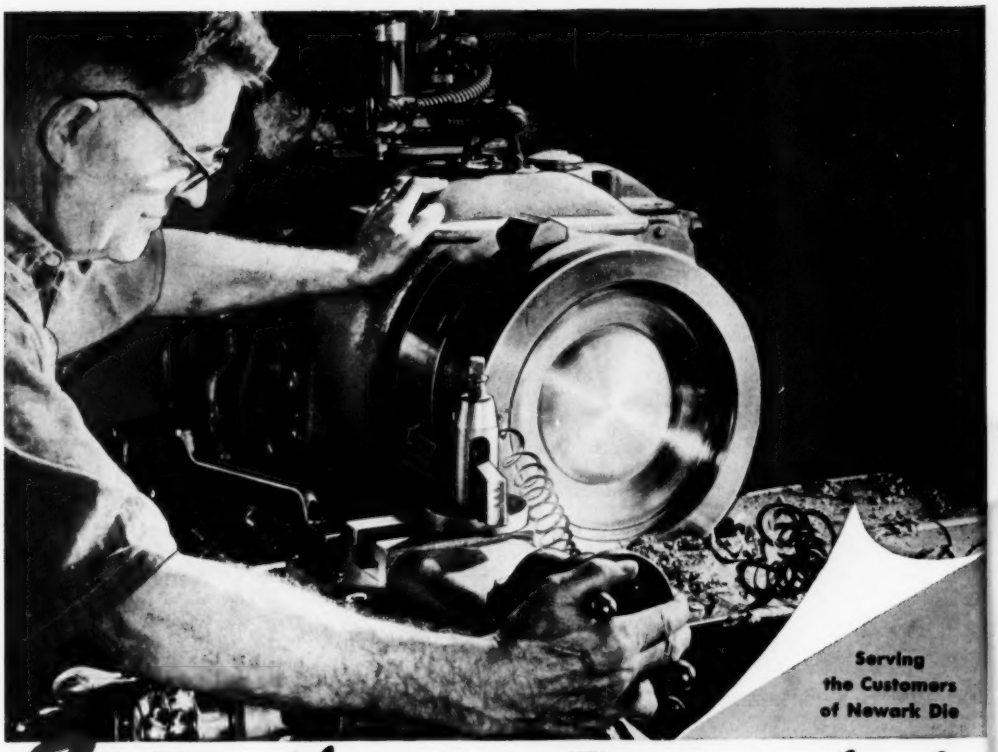
Apr. 9-11—Society of the Plastics Industry, Seventh Annual Technical Session, Reinforced Plastics Div., Edgewater Beach Hotel, Chicago, Ill.

May 11-14—American Institute of Chemical Engineers, French Lick Springs Hotel, French Lick, Ind.

June 9-21—International Organization for Standardization, Triennial Meeting, Columbia University, New York, N. Y.

June 23-25—Forest Products Research Society, Sixth Annual National Meeting, Milwaukee, Wis.

June 23-27—American Society for Testing Materials, 50th Anniversary and Annual Meeting, Hotels Statler and New Yorker, New York, N. Y.



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Here at Newark Die Company, lathe work combines skilled craftsmanship and up-to-the-minute machine tooling —to bring the final touch of accuracy to the molds that are designed by Newark Die engineers.

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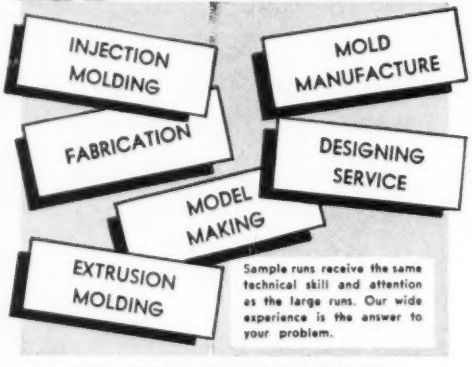
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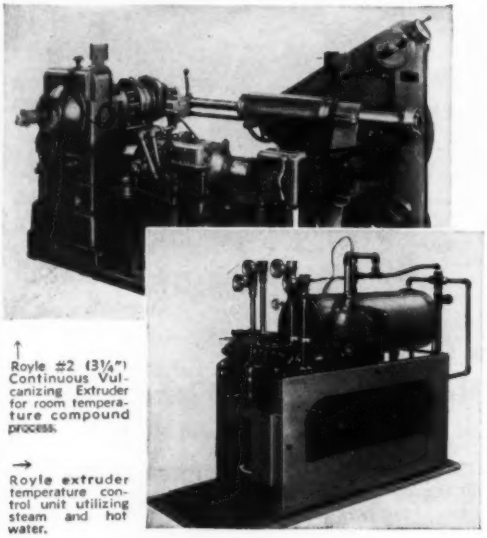
The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
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*Licensees of Western Electric Company

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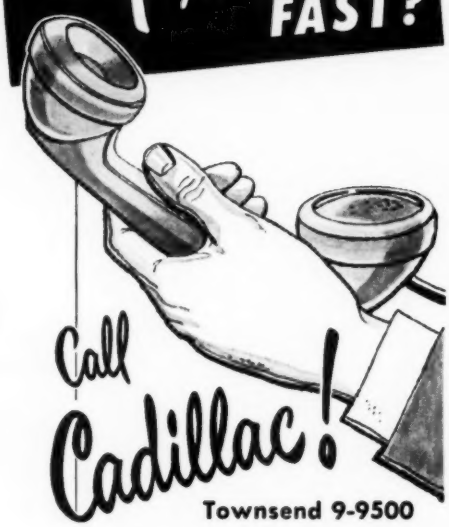

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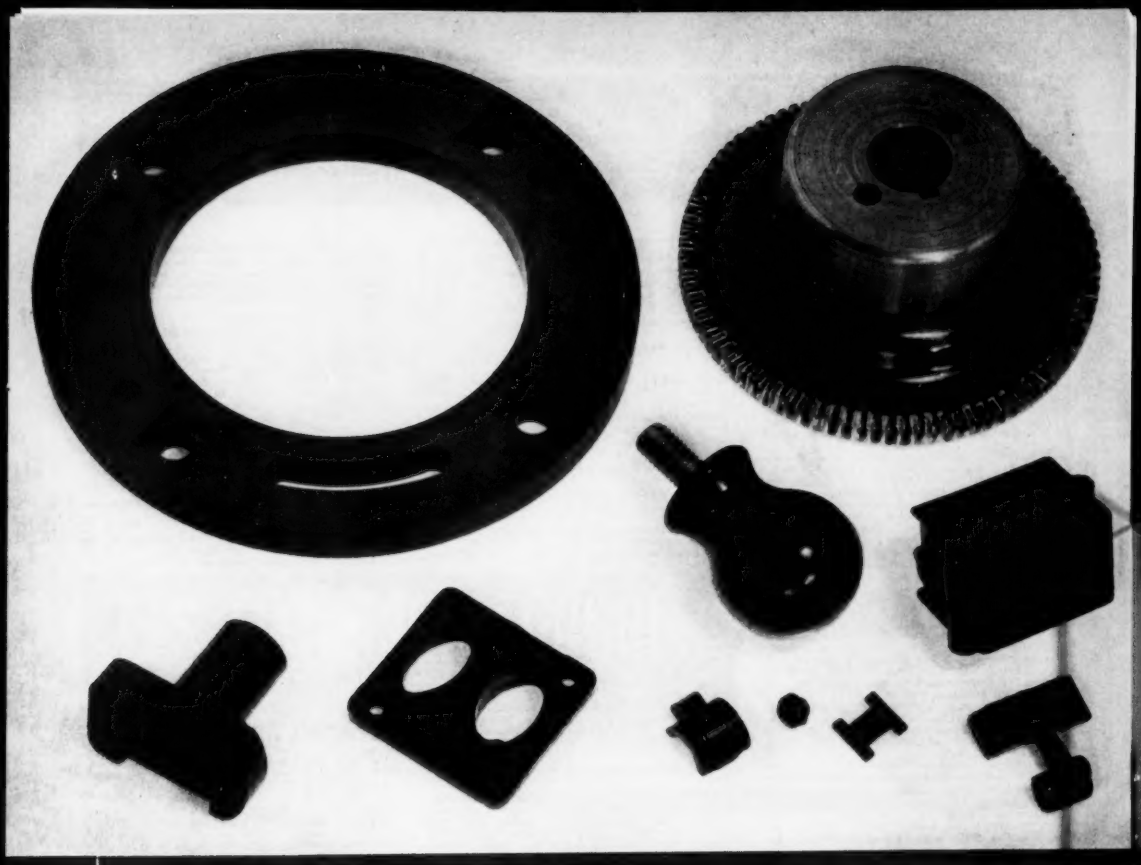

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MACHINERY and EQUIPMENT FOR SALE

We handle hydraulic presses, pumps, and power units of all sizes. Write us your requirements and we will try to help you. We find it impossible to list our equipment in this classified column due to the fact that the equipment is sold before ad is published. For those who seek action look in the New York Times under the Machinery and Tool Column for our regular Sunday Special. Hydraulic Sal-Press, Inc., 356-90 Warren Street, Brooklyn 2, N.Y. MAin 4-7847

FOR SALE: 1 Stokes DD2 Rotary Tablet Machine, Vari-Speed Drive and motor; 1—Farrel 16" x 42" Rubber Mill complete with drive and 75 H.P. Motor; 2—Ball & Jewel #2 Rotary Cutters, 50 H.P. Motors. Also Grinders, Extruders, Compression and Injection Molding Presses, Mixers, etc. Send us your inquiries. Consolidated Products Co., 13-14 Park Row, New York 38, New York.

FOR SALE: 50 Ton Stokes Presses & Pump, 200 Ton W.S. Hobbing PRESS, 300 Ton W.S. PRESS 24 x 20 Platen, 175 Ton H.P.M. PRESS 30 x 30 Platen, 150 Ton Farrel PRESS 30 x 30 Elec. Plates. 140 Ton W.S. PRESS 23 x 17 Platens, 85 Ton Stewart Bolling PRESS 20 x 20 Platen, 50 Ton Elmes PRESS with 18 x 18 Elec. Plates, 75 Ton W.S. PRESS 15 x 15 Platen, 75 Ton Adamson PRESS 20 x 20 Platens. Laboratory presses, Accumulators, Piston and Oil Pumps. AARON MACHINERY CO., INC. 45 Crosby St., N.Y.C.

FOR SALE: Quick delivery Rubber and Plastic Equipment. Farrel 16" x 48", and 15" x 36", 2 roll rubber mills. New 6" x 12" and 6" x 16" Lab. Mixing Mills and Calenders. Other sizes up to 84". Royle #½ and #2 extruders, also other sizes. 200 ton Brunswick 21" x 21" Platens, 14" Ram. Record Presses. Francis 175 ton 24" x 18". W.S. 115 ton 24" x 24". Also presses Lab. to 1500 tons from 12" x 12" to 48" x 48". Hydr. Oil Pumps. Gould 75 HP motor Dr. 2 stage Centrif. Pump 250# WP. Worthington 23 GPM, 2500 PSI., Triplex Hydr. Pump. W.S. 4 Plgr. High and low Pressure Hydr. Pump. HPM 10 GPM 2700 lbs. Elmes Hor. 4 Plgr. 4500 lbs. and 5500 lbs. Hydr. Accumulators. Closed Steel ASME Pressure Tank 275 PSI, 1200 gals. Stokes Automatic Molding Presses. Rotary & Single punch Preform Tablet Machines ½" to 3". Injection Molding Machines 1 oz. to 32 oz. Baker Perkins jacketed mixers 200, 9 & 4½ gals. Ball & Jewell & Leominster Plastic Grinders. Mikro Pulverizers 2 DH, 10 HP & other sizes. Heavy duty mixers, grinders, pulverizers, gas boilers etc. Partial listing. We buy your surplus machinery. Stein Equipment Co. 90 West Street, New York 6, N.Y. WOrth 2-5745.

FOR SALE: Thermex Preheater, Model 2P; Airtronics Preheater, Model D E; Airtronics Preheater, Model C B. Like new. AARON MACHINERY CO., INC. WOrth 4-8233, 45 Crosby St., New York 12, N. Y.

FOR SALE: Complete Plastics Extrusion Plant, Comprising: 2—2" Extruders, 5—Stage Electric Heating, Variable Speed Motor Drive; 2—Belt Conveyor Tables; 2—8-Reel Windup Stands; 2—Automatic Variable Length Cutoff Machines; Water and Air Cooling Troughs; ¼ HP Motor Driven Rotary Scrap Cutter; Dies & Miscellaneous Extras. All still set up in a nearby plant. Also, in our local stock: Hydraulic Compression Molding Presses, ranging from 30 to 400 Tons, various platen sizes; Hydraulic Pumps and Accumulators; Preform Machines; Injection Molding Machines; Mills; Grinders; Rotary Cutters; Boilers; Compressors; Machine Tools; etc. All types of equipment for Plastics and Rubber Processing. For full details, inspection, etc., communicate with INDUSTRIAL EQUIPMENT COMPANY, 45 CLINTON STREET, NEWARK 2, NEW JERSEY. MARKET 3-1431.

FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box 1432 Modern Plastics.

FOR SALE: 6 Rotary Pellet Presses: Kux model 25 (21 punch and 25 punch); Stokes D-3 and D-4. Read Co. 250 gal. heavy duty double arm sigma blade jacketed mixer, stainless steel. PERRY EQUIPMENT CORP., 1429 N. 6th St., Phila., 22, Pa.

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FOR SALE: Three Reed-Prentice injection machines in excellent condition. Two 8 oz. (one with 10 oz. cylinder), 1946 model, used only three years. One 16 oz., 1950 make. Call in New York City ST 6-9100. Reply Box 1421, Modern Plastics.

FOR SALE: Injection Presses: 4, 9, 16 oz. HPM, 6 & 12 oz. Reed. 8 oz. Watson. 22 oz. Impco, 2 oz. DeMattia, 1 oz. VanDorn, Extruders: 1" Benchlab NRM. 1 conveyor 40'. Scrapgrinders, Ovens. 250 tons Transferpress. 50, 250, 600 tons Compression Presses. 3—3 & 5 KW Thermall Preheaters. 1—250 tons, 10 Plat. 26" x 28" Laminatingpress — Preformpresses: Colton E, Stokes T, Kux 60B. 1—Nash Rotary Edger. 2—Embossing Calenders 61" wide. 1—Sheridan Embossing Press. 1—7½ HP Vacuumpump. Large Deepdraw vacuum press assembly. 1—42" Johnstone Slitting & Rewind. machine. List your surplus equipment with me. Justin Zenner, 823 W. Waveland Ave., Chicago 13, Ill.

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Colton 2 and 3 RP Rotary Tablet Machines.
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Baker Perkins & Readco Heavy Duty Steam Jacketed, Double Arm 50, 100, 150 gal. Mixers.
Baker Perkins 150 Gal. D. A. Unidor Jacketed Mixer.
Baker Perkins 100 gal. D. A. Vacuum Mixers.
J. H. Day 75 & 55 gal. Imperial and Cincinnatus D. A. Jacketed, Sigma Blade Mixers.
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FOR SALE: American-Marsh Steam Driven Hydraulic Pump size 18" x 3" x 12". Working steam pressure 150 PSI. Hydraulic pressure 2500 PSI. Hard Chrome Plated Water Plungers. Stainless steel water valves and seats. 2" Water inlet. 1½" Water outlet. In excellent condition. Reply to Modern Plastics Corporation, North Shore Drive, Benton Harbor, Michigan.

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8-Oz. Reed, 10-D; '42 up; Leominster, Lesters, and other types. all in good condition . . . . . $8000. up
9-Oz. H.P.M. Mod. 200-99; good condi. $5950.
16-Oz. Impco, Reeds, HPM, W&S, good . . . . . $15,000. up
12-Oz. Reed, good condition . . . . . offers
22-Oz. Impco & Reed, Model 10-H; good . . . . . $19,500. up
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1-Oz. Van Dorn, serial #430 class; good condition . . . . . $950.
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HARTIG 1¼" & 3½", Model 500, good condition . . . . . $3500. up
National #2½; late, oil heated, good condition . . . . . $6500.
HYDRAULIC COMPRESSION PRESSES
H. Pm. 1300, 450, 350 ton; new '45 and up . . . . . offers
Baldwin Southwark, 350 tons; 18"; 24 x 24 platens . . . . . $2,975.
Watson Stillman; 275-225 tons; 24 x 55—24 x 24 . . . . . $2,975. up
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Farrel 200 tons; 14" ram; 24 x 24 platens . . . . . $1,750.
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300-400 HPM 1935 up; 48 x 36" bed & up . . . . . offers
200-Defiance #45 preform; new 1946; good . . . . . $16,000.
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Phenolic Power Plant, 200,000# per month . . . . . offers
Huskey #6 Marking Machine; good condition . . . . . $950.
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Hydraulic Pumps, low & high pressure, good condition . . . . . offers
Federal Megatherm Induc. tablet curing machines. . . . . 1,600 ea.
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(*Continued on page 298*)

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» F	50	» 50 Grs
» F	120	» 120 Grs
» F	500	» 500 Grs

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CLASSIFIED ADVERTISING

(Continued from page 296)

WANTED! WANTED! WANTED! INJECTION MOLDING MACHINES, AND PRESSES, ALL SIZES. ALSO ANY OTHER PLASTIC OR HYDRAULIC MCHNRY. Superior Machine Tool Co., 803 Housatonic Ave. Bridgeport, Conn. 5-5890.

WANTED: To Expedite Production—Rubber Making Machinery including Banbury Mixers, Heavy Duty mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set up plant now operating or shut down. When offering give full particulars. P.O. Box 1351, Church Street Sta., New York 8, N. Y.

WANTED: Extruder—used: Please give size, condition, price and location, and Reply to box 1403, Modern Plastics.

WANTED IMMEDIATELY: 16 oz. W.S. or H.P.M. injection molding m[illegible]h. Also Cumberland ½ or 1½ grinder or Ball & Jewel Midget or Lab. model. Reply Box 1407, Modern Plastics.

WANTED: 4 oz. Vertical injection press. Watson-Stillman Lester or Demattia. Recent model and must be in good operating condition. Plastic Mold & Die Co., 308 So. 3rd Street, Darby, Penna.

WANTED IMMEDIATELY: A 60 inch Cameron score cutting paper slitter of type 9.5 or type 6. Reply Box 1412, Modern Plastics.

WANTED FOR EXPORT: Injection Molding Machines up to 8 oz. capacity. Reply Box 1424, Modern Plastics.

MACHINERY & EQUIPMENT WANTED: Exporter looking for Plastic Injection molding equipment, as well as molds for injection & compression machines; all sizes both in machinery & molds. Also seeking offer for all types plastic raw materials. Outright purchase & payment in N.Y. for suitable offers. Reply Box 1435, Modern Plastics.

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New manufacturer setting up plant desires to purchase injection molding machines:

2—12 oz. Reed Prentice
2— 8 oz. Reed Prentice
1— 6 oz. Reed Prentice
1— 4 oz. Reed or H. P. M.

Equipment must be late models and stand rigid inspection. Please give full particulars, stating make, model, condition, price. Address reply:

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MATERIALS FOR SALE

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FOR SALE: ACRYLIC SHEETS—Foreign company is inviting inquiries from fabricators and distributors interested in the import of Acrylic sheets steady delivery. Reply to Box 1413, Modern Plastics.

BUY—BARTER—SELL: Phenol—Phthalic—Maleic—Glycols—Titaniums—Zinc Oxides—Hydrosulfite — Bichromates — Ethanolamines — Pine Oil—Benzol—Dyes—Colors, etc. CHEMICAL SERVICE CORP., 96-04 Beaver St., New York 5, N.Y.

MATERIALS WANTED

WANTED: Plastic scrap such as Cellulose Acetate, Vinyls, Acrylic, Ethyl Cellulose, Polystyrene, Butyrate, etc. We also buy surplus inventories of molding powder or grind, clean and reprocess your own scrap. Claude P. Bamberger, Inc., 152 Centre St., Brooklyn 31, N. Y. Tel. Main 5-5553. Not connected with any other firm of similar name.

WANTED: By injection molder—Polystyrene molding powder in any form: scrap, reground, mixed colors, surplus virgin, etc. will purchase on contract basis if desirable. Send samples and best quotations to Waldor Products Molding Co., 132 Mallory Ave., Jersey City, N.J.

WANTED: PLASTIC SCRAP or REJECTS in any form: Cellulose Acetate, Butyrate, Polyethylene, Polystyrene, Vinyl, Acrylic and Ethyl Cellulose. Reply Box 1383, Modern Plastics.

WANTED: PLASTIC Scrap or Rejects in any form. Acetate Butyrate, Polystyrene, Acrylic, Vinyl Polyethylene, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding, magnetizing and compounding. Reply Box 1381, Modern Plastics.

WANTED: Plastic Scrap, Rigid Vinyl, Cellulose Acetate, Polystyrene, Polyethylene, Butyrate, Custom grinding, magnetizing, compounding, and straining of contaminated plastics. Franklin Jeffrey Corporation, 1671 McDonald Avenue, Brooklyn, N. Y. ES 5-7943.

SURPLUS UREA MOLDING POWDER WANTED. Reply Box 1386, Modern Plastics.

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FOR SALE: Molds for 4 oz. or larger injection molding. One 2½" Barrette Mold, 40 cavity, 23 interchangeable designs. One 4" Back Barrette Mold, 6 cavity, 7 interchangeable designs. One Plastic Waver Mold, 5 cavity. All designs have Hobs for making additional cavities. Actual size pictures and some samples are available. Beliaeff, Spook Rock Road, Suffern, N.Y.

Manufacturer who is withdrawing from diversified proprietary molding in order to concentrate on one field seeks to sell injection molds for 8-16 oz. machines, utility and jewelry boxes, flower pots, housewares, novelties, display and utility trays. Reply Box 1422, Modern Plastics.

MOLDS FOR SALE: Excellent line of plastic Knobs and Pulls and Shields. Finest made to date anywhere. Excellent value for complete set involving four molds. Samples on request. Best offer takes lot. Reply Box 1428, Modern Plastics.

MOLDS WANTED

MOLD WANTED for injection molding. We will buy one mold or a complete line or series of molds for finished resalable items. Housewares, toys, novelties, etc. Will also buy molds for industrial parts such as handles, knobs, drawer pulls, gears. All items for resale in U. S. A. Send detailed information to Victory Manufacturing Company, 1722 W. Arcade Place, Chicago 12, Illinois.

WANTED INJECTION MOULDS of stationery and school plastics items by responsible Chilean firm, for rental. All suitable guarantees offered. Willing to enter into continuous contractual arrangement with responsible American firm. Reply Box 1384, Modern Plastics.

WANTED: Plastic Molds—for 8 oz. Reed Prentice Machine. P. O. Box 59, Kent, Ohio.

MOLD WANTED: Consumer items, Household, toy, to be used with 4 and 8 oz. REED PRENTICE injection molding machine for export. Submit samples from molds offered. Reply Box 1401, Modern Plastics.

WANTED FOR EXPORT: Injection Molds suitable for machines up to 8 oz. capacity. All items considered. Reply Box 1425, Modern Plastics.

BUYING USED MOLDS: As agents for overseas molding factories we want urgently USED INJECTION MOLDS FOR OUTRIGHT SALE or RENT ON ROYALTY BASIS. Reply with all details to Box 1434, Modern Plastics.

HELP WANTED

Experienced man in plastics used by wire and cable manufacturers. To select, test and supervise materials used in extrusion and injection molding. Degree not necessary but experience is. Good future for the right man in the South with an established company. Salary plus profit percentage. Send complete experience and personal information including picture. Reply Box 1387, Modern Plastics.

We require the services of a person experienced in mixing and preparing monomer for embedding purposes. Must have thorough knowledge of proper mix and curing of same into crystal clear blocks. New department being set up in old established firm. Send complete resume, giving education, experience, reference, salary commanded or required. Reply Box 1433, Modern Plastics.

COATER ENGINEER OR FOREMAN — Excellent opportunity for experienced man to assume responsibility over new department being set up in old, established firm. Experience necessary with organisols and plastisols. Reply stating all personal qualifications and business experience. All replies confidential. Reply 1388, Modern Plastics.

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Rohm & Haas Company, Office of Technical Employment, 500 Richmond Street, Philadelphia 37, Pa.

(Continued on page 300)

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CLASSIFIED ADVERTISING

(*Continued from page 298*)

TECHNICAL SERVICEMAN: Graduate Engineer with minimum of 3 years' experience in injection molding. Requires thorough knowledge of plastic materials, application, testing, mold design, molding and finishing operations, some knowledge of extrusion. Should be willing to travel throughout the country. Our staff knows of this advertisement. Qualified applicants will be answered promptly. Reply Box 1402, Modern Plastics.

An expanding Mississippi Molder offers an opening to an experienced tool maker with a general all-around background in plastic mold making who would be interested in pleasant small town surroundings at large town wages. Reply Box 1405, Modern Plastics.

INJECTION MOLDING SHIFT FOREMEN: Two high-calibre men needed for night shift foremen at Injection Molding Plant located in the South. Excellent opportunity with fast growing company. Complete knowledge of injection molding required. Send complete personal and business history. Reply Box 1408, Modern Plastics.

MECHANICAL ENGINEER
OR
ENGINEERING PHYSICIST

The plastics laboratories of an established chemical company in a Middle Atlantic State are seeking a Mechanical Engineer or Engineering Physicist to conduct special investigations on thermoplastic sheets. Responsibilities also include liaison work with production groups. In addition to a degree from an accredited university, the man selected must have at least 2 years' experience in the development and application of thermoplastic compounds. Reply, which will be kept confidential, should be in writing and include complete resume of education and experience and information as to salary expected. Reply to Z-10, P.O. Box 3414, Philadelphia 22, Pa.

AGGRESSIVE PLANT SUPERINTENDENT required by a small Midwestern compression molding and laminating plant. Must have complete knowledge of compression molding, impregnation of cloth, paper, etc., as well as painting of finished products. Must have knowledge of labor relation and all the matters pertaining to production. This is an excellent opportunity with a growing company. Reply Box 1415, Modern Plastics.

Well established phenolic laminating and compression molding plant has a very good opening for an experienced chemical engineer familiar with all phases of this and development engineering work. Please reply giving complete details of past experience and salary requirements. Reply Box 1416, Modern Plastics.

An expanding midwestern compression molding and laminating plant offers a good opportunity to an experienced chemist with a background which would be valuable especially in development work and improving the standard of present products. Please give complete details and salary requirements to Box 1417, Modern Plastics.

PROJECT ENGINEER, preferably M. E to handle product development of all thermoplastics with progressive New England Company. Experience in thermoplastics desirable but not essential. Send complete resume giving education, experience and salary commanded or required in first letter to Box 1418, Modern Plastics.

WORKING PLASTICS ENGINEER to supervise manufacturing of small compression molding plant, accept full responsibility production, experienced estimate new products. Position offers opportunity to join management if proven right man. Reply Box 1419, Modern Plastics.

MOLD AND TOOL DESIGNER
FOR PLASTIC INDUSTRY

The services of a designer familiar with production techniques relating to molded and extruded plastic products are sought by Western New York State manufacturer. The work will involve mold, tool and fixture design as well as design of simpler dies. The opening will appeal to a young man who is presently employed in a junior designer or draftsman capacity in the field of plastics production. He will enjoy an association with a substantial, long-established company which has recently extended its production facilities to include manufacture of special purpose plastic products. In his new capacity, he will have an opportunity to grow with a new and expanding division. Correspondence is solicited from men with the required background in education and experience. Such correspondence will be treated in strict confidence. Members of this company's engineering staff know about this opening. Reply Box 1420, Modern Plastics.

PLASTIC DIVISION—NIGHT SUPERINTENDENTS: Two high caliber men needed to handle supervision of night shift's at large Chicago concern, engaged in injection, molding, extrusion and sheet-forming. This is not a Foreman's job. Mechanical Engineer preferred but not essential—Salary open—send complete resume of education and experience. Reply Box 1427, Modern Plastics.

PLASTIC ENGINEER: Prominent plastic molder in the Cleveland Area desires services of a plastic engineer. Degree helpful but not a requisite. Must be experienced on compression molding and have ability to quote piece part prices. Kindly give complete details in first letter, including salary requirements. Reply Box 1429, Modern Plastics.

Extrusion plant in Metropolitan New York Area desires top notch man to assume full responsibility for entire production including die design and job setups in rigid and flexible materials. Excellent opportunity with established and growing concern. Give full details on background and salary desired. Replies confidential—our staff knows of this ad. Reply Box 1431, Modern Plastics.

SALES REPRESENTATIVE WANTED: Large AAAA Plastic Extrusion House desires representation by established sales organization in Mid-West. Wide range of flexible and rigid plastic extrusions manufactured in various engineered shapes and sizes for applications requiring channeling, glazing, gasketing, weatherstripping, splining, tying cords, low power pulley drives, and many others. Write giving full details of organization and territory. Reply Box 1426, Modern Plastics.

SALES REPRESENTATIVE, Hawaiian Islands. Covering all islands. We have openings in plastic hobby supplies. We have many inquiries from hobby wholesalers. Write: Hawaii Plastics, 160 Mokauea Street, Honolulu, Hawaii.

SALES REPRESENTATIVES WANTED: We have as fine equipment for coating fabrics as can be found. Top quality vinyl-glass and other materials. Well staffed and equipped research lab including pilot coaters. Interested only in highest quality materials and hard-to-do jobs. Looking for commission representative in Metropolitan Area, New England, Chicago, and Detroit. Reply Box 1423, Modern Plastics.

SALESMAN'S OPPORTUNITY: with growing, well established Chicago plastics firm with injection and extrusion facilities. Applicant must be experienced, enjoy good reputation and be well-known in plastics field. To the right man we offer an opportunity to grow with us, more-than-average salary, incentive plan and guaranteed security. Give full details in confidence. Reply Box 1404, Modern Plastics.

SITUATIONS WANTED

Manager of extrusion plant desires change. Thoroughly familiar with all phases of large plant operation—directing sales force, purchasing, cost control, inventory, advertising. Previous experience in research, chemical formulations, compounding, injection molding. Chemical engineer. Several industrially successful patents. Articles published. Excellent sales contacts and relations with material suppliers. Enterprising personality with a record of results. Reply Box 1400, Modern Plastics.

EXECUTIVE ASSISTANT: BS, MA, married, 32, 5 years varied technical experience, including three years management and production and two years chemical laboratory work. Good appearance, pleasing personality. Desire live wire position with growth potential. Capable of heavy responsibility. Location immaterial. Reply Box 1406, Modern Plastics.

PLASTICS ENGINEERING OR MANAGEMENT: Energetic, personable engineer with ability to produce results. Ten years experience: development, design, production, and sales. Extensive knowledge of honeycomb and polyester laminates, coated fabrics, extrusion and injection molding, polymerization, and product application development. Chemical Engineer (BSE), Mechanical Engineer (MS), age 33. Write: 1132 Beech St., South Pasadena, Calif.

MISCELLANEOUS

SHEET PLASTIC—RUBBER PLANT: complete with 5 roll Baker Perkins Calender; 40" Mill; Boiler; Preheater; etc. Plant now in operation. Will sell whole or half interest. Located in Los Angeles, California. Reply Box 1409, Modern Plastics.

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EXCLUSIVE OPPORTUNITY: New invention, patent applied for, provides strong sales opportunities wherever pencils and crayons are sold. Will sell outright or part royalty basis to live-wire manufacturer-distributor. This is a "Natural" low cost big turn over item. Full particulars sent upon request. A. F. STEIERT, 1842 Lindley Ave., Phila. 41, Pa.

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For further information address Classified Advertising Department, Modern Plastics, 575 Madison Ave., New York 22, N.Y.

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INDEX OF ADVERTISERS

MARCH 1952

Accurate Molding Corp. 224
Ackerman Plastic Molding 295
Acromark Company, The 196
Adamson United Company 197
Advance Solvents & Chemical Corp. 163
Albert, L., & Son 274
Allied Chemical & Dye Corp., Barrett Division 38, 155
American Anode, Inc. 70
American Cyanamid Company, Plastics and Resins Div. . 142, 143
American Insulator Corporation . 88
American Lucoflex, Inc. 22
American Molding Powder & Chemical Corp. 223
American Phenolic Corp. 275
American Pulverizer Company .. 228
American Steel Foundries, Elmes Engineering Division 231
American Wheelabrator & Equipment Corp. 178, 179
Amos Molded Plastics 71
Anderson Bros. Mfg. Co. 201
Apex Electrical Mfg. Co., The .. 45
Apex Machine Mfg. Corp. 297
Atlas Valve Company 200
Avery Adhesive Label Corporation 44

B.I.P. Engineering Ltd. 84
B.I.P. Tools Ltd. 74
Bailey, R. N., & Co., Inc. 202
Bakelite Company, A Division of Union Carbide & Carbon Corp. 51, Inside Back Cover
Baker Brothers, Inc. 61
Baker Castor Oil Co., The 281
Ball & Jewell, Inc. 27
Bamberger, A., Corp. 285
Bamberger, Claude P., Inc. 204
Barrett Div., The Allied Chemical & Dye Corp. 38, 155
Black-Clawson Co., Inc., The, Dilts Machine Works 250
Bolta Products Sales, Inc. ..166, 167
Boonton Molding Co. 28
Bridgeport Moulded Products, Inc. 82
Brosites Machine Company, Inc. 214
Brown Company 172
Butterfield, T. F., Inc. 218
Buttondex Corp. 213

Cabot, Godfrey L., Inc. 236
Cadillac Plastic Co. 294
California Reinforced Plastics Co. 58
Cameron Machine Company 49
Carpenter Steel Co., The 210
Carver, Fred S., Inc. 253
Catalin Corporation of America . 1
Celanese Corporation of America, Plastics Division 9
Chicago Molded Products Corp. . 4
Claremont Pigment Dispersion Corp. 218
Claremont Waste Mfg. Co. 199
Classified 296, 298, 300
Clopay Corporation 32
Coating Products 256
Conforming Matrix Corporation 204
Connecticut Plastic Products Co., Inc. 273
Consolidated Molded Products Corp. 230
Continental Can Company 185
Continental Paper Grading Co. .. 33
Continental Screw Company 87
Crucible Steel Company of America 243
Cruver Manufacturing Co. 64
Cumberland Engineering Co. Inc. 39
Curbell Inc. 207

Davies, Joseph Plastics Co. 188
Deakin, J. Arthur & Son 299
Dennis Chemical Company 192
Detroit Macoid Corporation 73
Detroit Mold Engineering Co. .. 24
Diemolding Corporation 212
Dilts Machine Works, The Black-Clawson Co., Inc. 250
Distillation Products Industries . 81
Doram Products, Inc. 227
Dow Chemical Co., The 287
Drakenfeld, B. F., & Co., Inc. .. 250
Dunning & Boschert Press Co., Inc. 200
du Pont de Nemours, E. I., & Co. (Inc.) Polychemicals Dept. .. 7
Durez Plastic & Chemicals, Inc. Inside Front Cover

Eagle Tool & Machine Company 271
Eastman Kodak Company, Cellulose Products Division 153
Elastomer Chemical Corp. 255
Electric Auto-Lite Co., The 171
Elmes Engineering Div., American Steel Foundries 231
Emery Industries, Inc. 293
Erie Engine & Mfg. Co. 206
Erie Resistor Corp. 77
Ever Ready Label Corp. 273

Fabricon Products, Inc., Plastics Div. 228
Farley & Loetscher Mfg. Co. 190
Farrel-Birmingham Company, Inc. 246, 247
Fellows Gear Shaper Co., The .. 63
Ferro Corporation 271
Firestone, Chemical Sales Div. .. 269
Flexfirm Products 215
Flintkote Company, The 258
Formica Co., The 41
Foucher, Machines, Les 297
French Oil Mill Machinery Co., The 193

Gane Brothers & Lane, Inc. 270
Geissel Mfg. Co., Inc. 201
General Electric Company 203, Inside Back Cover
General Industries Co., The 220
General Plastics Corp. 254
Gering Products Inc. 59, 195, 201, 229
Girdler Corporation, The 241
Gits Molding Corporation 265
Glass Fibers Inc. 261
Glidden Company, The 239
Goodrich, B. F., Chemical Co., The 3
Goodyear Tire & Rubber Co., The Chemical Div. 19, 35
Gries Reproducer Corp. 172

H & R Industries 195
Hardesty Chemical Co., Inc. 12
Harrington & King Perforating Co., The 254
Harvey, Guy P., & Son Corp. ... 240
Hawley Products Co. 225
Heyden Chemical Corporation .. 209
Hinde & Dauch Paper Co., The . 83
Hobbs Manufacturing Co. 174
Holliday, W. J. & Co., Inc. 303
Hommel O., Company, The 266
Honan-Crane Corporation 266
Hurlbut Paper Company 245
Hydraulic Press Mfg. Co., The 20, 21
Hy-Pro Tool Co. 87

Iddon Bros. Ltd. 42
Ideal Plastics Corporation 56, 57
Imperial Molded Products Corp. 205
Industrial Heater Co., Inc. 274
Industrial Mfg. Corp. 206
Industrial Ovens, Inc. 260
Industrial Plastics Co. 26
Industrial Plastics and Coating .. 304
Industrial Research Laboratories 270
Interchemical Corporation, Finishes Division 265
International Textile Company . 264
Irvington Varnish & Insulator Co. 79

Jackson & Church Company 276, 277

Kellogg M. W., Co., The 233
Kentucky Color & Chemical Co., Inc. 257
Kingman, E. B. Co. 292
Kingsley Stamping Machine Co. . 263
Kleemann, O. & M., Limited ... 37
Kohnstamm, H., & Co., Inc. 299
Koppers Company, Inc. 29
Kurz-Kasch, Inc. 17

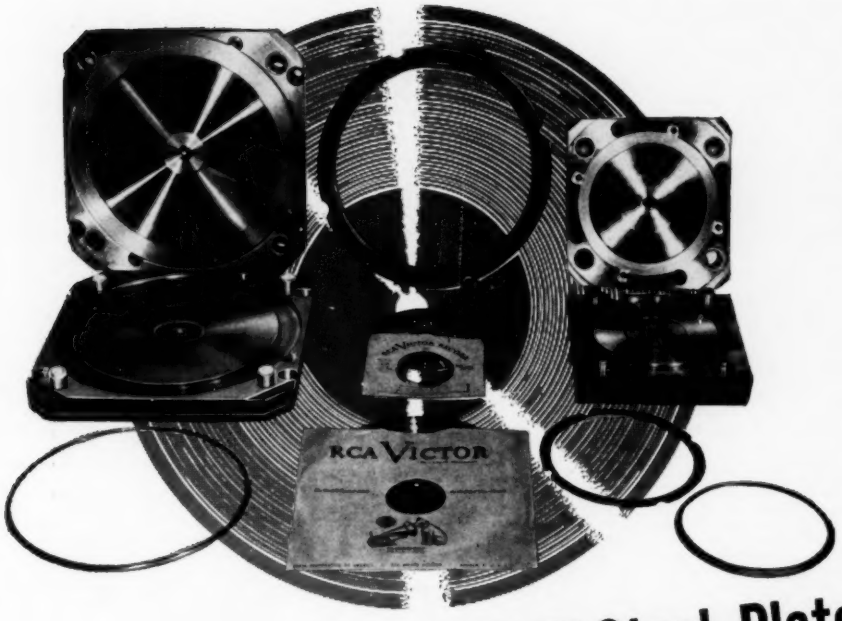
Lane, J. H., & Co., Inc. 193
La Rose, W. T., & Associates, Inc. 190
Lembo Machine Works Inc. 259
Lester-Phoenix, Inc. 34
Lewis Welding & Engineering Corp., The 238
Livingstone Engineering Co. 262
Loven Chemical of California .. 11
Lunn Laminates, Inc. 254

Mack Molding Company, Inc. .. 227
Manco Products Inc. 195
Manufacturers' Literature .. 221, 222
Marblette Corp. 148
Marvel Engineering Company .. 252
Mayflower Electronic Devices, Inc. 244
Mearl Corporation, The 212
Metalsmiths, Division of Orange Roller Bearing Co., Inc. 202
Metaplast Process, Inc. 48
Metasap Chemical Company 226
Michigan Chrome & Chemical Co. 199
Michigan Molded Plastics, Inc. .. 196
Mico Instrument Company 213
Mid-American Plastics, Inc. 191
Midland Die & Engraving Co. .. 136
Mills, Elmer E. Corporation 53
Minneapolis Plastic Molders, Inc. 182, 183
Minnesota Plastics Corp. 36
Mitts & Merrill 192
Modern Plastic Machinery Corp. 13
Molded Products Corporation ... 54
Molded Resin Fiber Company .. 242
Monsanto Chemical Co., Organic Chemicals Division 25
Monsanto Chemical Co., Phosphate Division 159
Monsanto Chemical Co., Plastics Division 283
Morart Gravure Corporation ... 292
Morningstar Corp., The 234
Mosinee Paper Mills Company .. 157
Moslo Machinery Company 191
Mount Hope Machinery Company 227
Muehlstein, H., & Co., Inc. 273

National Automotive Fibers, Inc.. 268
National Lead Company 40
National Rubber Machinery Co. . 65
Naugatuck Chemical 187
Newark Die Company 291
New England Lacquer Co. 274
New Hermes, Inc. 217
Nixon Nitration Works 43
Nordan Plastics Corp. 258
Northern Industrial Chemical Co. 174
Norton Laboratories, Inc. 237

Omni Products Corporation 249
Orange Products, Inc. 206

(*Continued on page 304*)



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Quality of RCA Victor Records is world renowned and record breaking quantities are not uncommon. Time-saving machining schedules and the necessity for a mold steel that "can take it" call for Speed Treat. The supply of Speed Treat is limited, but check with your nearest source. Keep yourself posted on this unusual plate steel.

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INDEX OF ADVERTISERS

(Continued from page 302)

Parker-Kalon Corporation 60
Parker Stamp Works, Inc., The . 173
Peter Partition Corp. 251
Pittsburgh Coke & Chemical Co. 47
Plant Installations Ltd. 268
Plaskon Division, Libbey-Owens-Ford Glass Company 139
Plastic Molding Corporation 242
Plastic Research Products 67
Plastics Engineering Company .. 23
Plastimold Corporation 299
Plax Corporation 62
Preis, H. P., Engraving Machine Co. 229
Progressive Machine Co., Inc. .. 224
Projectile & Engineering Co. Ltd., The 219
Pyramid Plastics, Inc. 262
Pyro Plastics Corporation 30, 31

Quinn-Berry Corp. 8

Radio Receptor Company, Inc. .. 72
Recto Molded Products 266
Reed-Prentice Corp. 10
Reichhold Chemicals, Inc. 169
Richardson Company, The 6
Rogers Corporation 55
Rohm & Haas Company, Plastics Products Division 85
Rohm & Haas Company, Resinous Division, The ..... 165 -
Ross & Roberts, Inc. 52
Royle, John & Sons 294
Rubber Corp. of America 229
Russell Reinforced Plastics Corp. 80

Safety Car Heating & Lighting Co., Inc. 272
Schulman, A., Inc. 268
Schwab & Frank, Inc. 264
Schwartz Chemical Co., Inc. 263
Scranton Plastic Laminating Corp. 267
Shaw, Francis & Company Ltd. . 86
Shaw Insulator Company 305
Sheet Steel Welding Engineering Co. 271
Sillcocks-Miller Co., The 250
Simplomatic Mfg. Co. 251
Singer Sewing Machine Co. 189
Sinko Mfg. & Tool Co. 199
Smart & Brown (Machine Tools) Ltd. 68
South Florida Test Service 204
Standard Machinery Co., The .. 50
Standard Tool Co. 255
Stanley Chemical Co., The 207
Sterling, Inc. 194
Sterling Electric Motors 16
Stewart Bolling & Company, Inc. 76
Stokes, F. J., Machine Co. 89-92
Stricker-Brunhuber Corp. 258
Styrene Products Limited 78
Surprenant Mfg. Company 66
Sussex Plastics Company 216
Swan Machine Company 304
Swedlow Plastic Co. 279

Tennessee Eastman Co. 161
Thermo Electric Co., Inc. 216
Thermo-Plastic Corp. 234
Timken Roller Bearing Co., The . 18
Titanium Pigment Corp. 69
Toledo Scale Co. 172
Transilwrap Co. 257
Tumb-L-Matic, Inc. 208
Tupper Corporation 46

Union Carbide & Carbon Corp., Bakelite Company 51, Inside Back Cover
United Buff Products Corp. 292
United States Gasket Co. 198

Van Dorn Iron Works Co., The 181

Waldron, John, Corporation ... 216
Waterbury Companies, Inc. 186
Watertown Mfg. Company 248
Watlow Electric Mfg. Co. 265
Watson-Standard Co. 235
Watson-Stillman Co., The 14, 15
Welding Engineers, Inc. 301
Westchester Plastics, Inc. 232
Western Felt Works 262
Wheelco Instruments Co. 257
Wiegand, Edwin L., Company . 211
Windsor, R. H., Ltd. 177
Witco Chemical Company 175
Woloch, George, Products Corp. . 297
Wood, R. D., Company 213
Worcester Moulded Plastics Co. . 306

Yardley Plastics Co. 289

Zenith Plastics Co. 75

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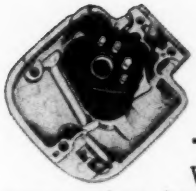

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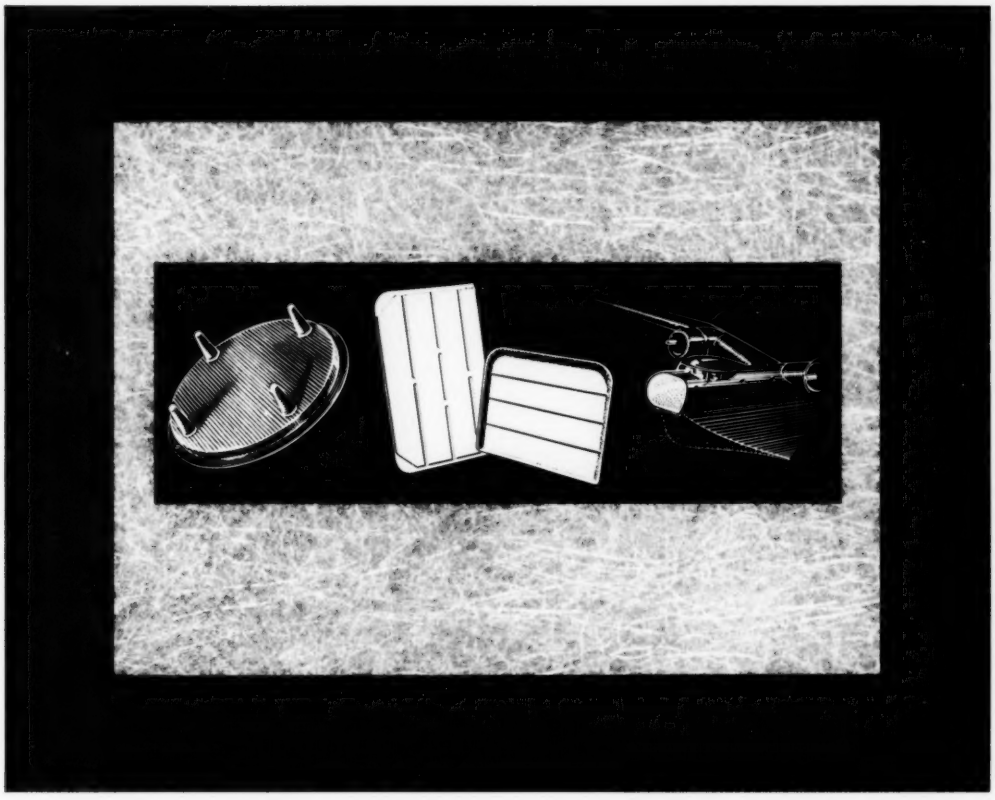

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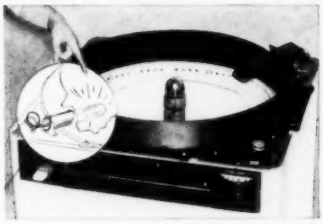

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